10th Issue

January 2018

BIMarabia

REVIT Families

Reconstruction, The Concept , and Applications of BIM

Focus on Modelling and Focus on Information

BIM Projects' Risk Management and Assessment

Go BIM!!

Contents

Team Work:

Omar Selim
Eng. Sonia Ahmed
Eng. Motasem Albanna
Eng. Maisoon Alsorori
Eng. Khalid Othman
Eng. Eman Mohey

Written By
Dr.Emad Al-Masry
Translated By
Khaled Othman

Introduction : Reconstruction , the Concept , and Applications of BIM

The new technology is always related to methodology of finding new solutions for people's problems keeping on improving their life, however it is often done when safeness and security are the predominant environment of the world.

But when wars and crises are being the main environment, the financial motivation becomesless and humanitarian motivation becomes the foundation, but sometimes you need to twist technology to get the most benefit out of it.

The same way for making the best benefit of BIM for reconstruction specially after warfare.

Mr. "Omar Selim" asked me to make an introduction for this topic showing my vision and I think this will need more researches , experiences and comprehensive activities which begin with the basics of reconstructionstages, controls and it's changing circumstances according to each country.

Taking into consideration the major method which is starting mastering and adopting BIM before crises and wars to assure the most benefit and to the fullest.

In the meantime and especially for Syria ,it is difficultto work on classifying areas of damage, and identifying quantities is difficult and not easy especially for the first reconstruction stage which includes response and early recovery.

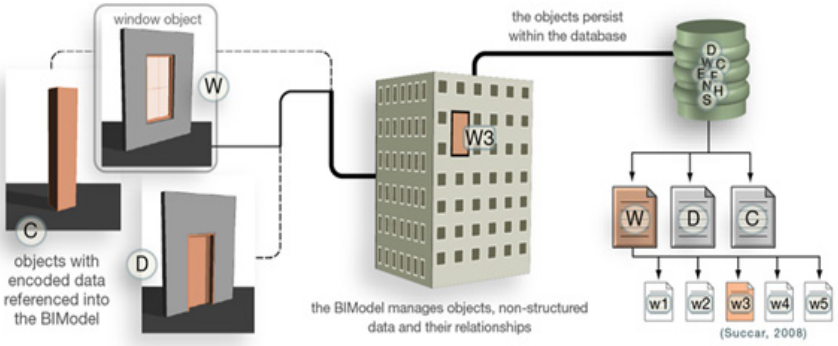
But for the transition zone between emergency and continuous progress, it would be possible to establish a new system for building modeling for planning new areas and their intersection "may be" with a reconstruction areas.

I think it is a necessity to work on adopting of this system during peace for buildings, as during crises or environmental, humanitarian disasters , classification and surveying are the most accurate and easiest case, also crises recovery and reconstruction will be fast and progressive.

To be continued...

Written by: Dr. Bilal Succar

Not all models or modellers qualify as BIM. Although there are neither clear definitions nor umbrella agreements of what constitutes a Building Information Modeller, researchers and software developers alike allude to a lowest common denominator.



This non-declared denominator is a set of technological and procedural attributes that BIModels (Building Information Models) need to have:

- Must be Three Dimensional,
- built from Objects (solid modelling - object oriented technology),
- have encoded and embedded [1] discipline-specific information (more than a mere database),
- have interwoven relationships & hierarchies between their objects (rules and/or constraints: similar to a relationship between a wall and a door where a door creates an opening in a wall),
- and describes a Building of some sort.

Again, the above attributes are the inclusive definitions of a BIModel. Needless to say, each proprietary and non-proprietary BIM package adds its own qualifications to the attribute pool in an attempt to squeeze its conceptual and commercial competitors out of the BIM acronym itself. Whether a package is interoperable, fully parametric or allows digital fabrication output has nothing to do with the inclusive set but are additional (and highly welcome) attributes. Exclusive definitions (those that exclude others) are quite simple: Surface Modellers (like SketchUp® for example), Entity-Based Modellers (like 3D AutoCAD®)

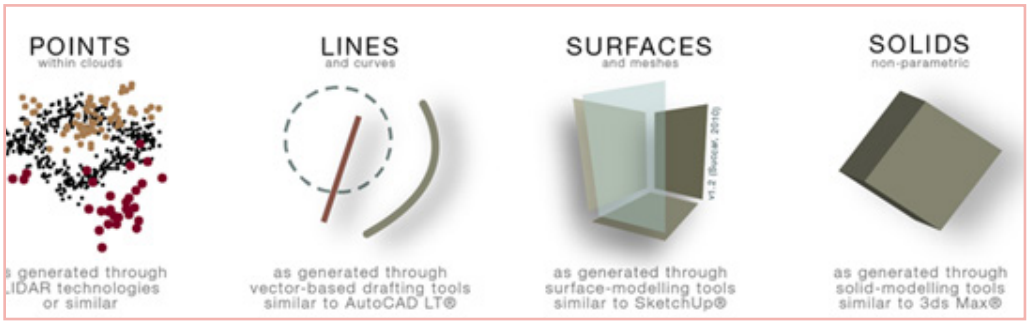


Figure 2.2: Non-BIM Modellers (updated image, June 2015)

To be continued; next Episode will focus on Information within Building Information Modelling

References:

[1] Blackler, F. (1995) Knowledge, Knowledge Work and Organizations: An Overview and Interpretation, Organization Studies, 16, 6, 1021-1046.

http://www.bimthinkspace.com/2005/12/the_bim_____episode.html

EPISODE 2: (Focus on Information)

Written by: Dr. Bilal Succar

"Architecture does not create buildings but creates information that creates buildings"

An elaboration on a quote by Robert Sheil, Bartlett School of Architecture, University College London

BIModellers do not depict nor encode the full scope of industry knowledge even within individual sectors (Architecture, Engineering or Construction). To express the matter differently, we first need to decipher what is really meant by 'information' within Building Information Modelling

There are five levels of 'meaning' that must be understood: Data, Information, Knowledge, Understanding and Wisdom. I will rely on Landauer [2] to define the first 4 levels yet risk providing my own definition for the last term:

Data is/are the basic observations and collectibles

Data is what you can see and collect

Information represents connected data whether to other data or to a context

Information is what you can see and say (collect then express)

Knowledge sets a goal for the information. Knowledge is the expression of regularity

Knowledge is what you see, say and able to do

Understanding is the transmission and explanations of a phenomenon within a context

Understanding is what you can see, say, do and able to teach

Wisdom is the action based on understanding phenomena across heterogeneous domains

Wisdom is seeing, saying, doing and teaching across disciplines and contexts.

Building Information Modelling deals with Data and Information only although some vendors would like to promote BIModellers as Knowledge-Based. As per the definitions above and if we assume Goals to be synonymous to encoded Rules, BIModels can include Knowledge-Based Models and Models based on Systems Thinking. In any case, discussion of these issues is well and truly beyond the scope of this article.

To be continued..the next Episode will discus BIM vs. Partial BIM

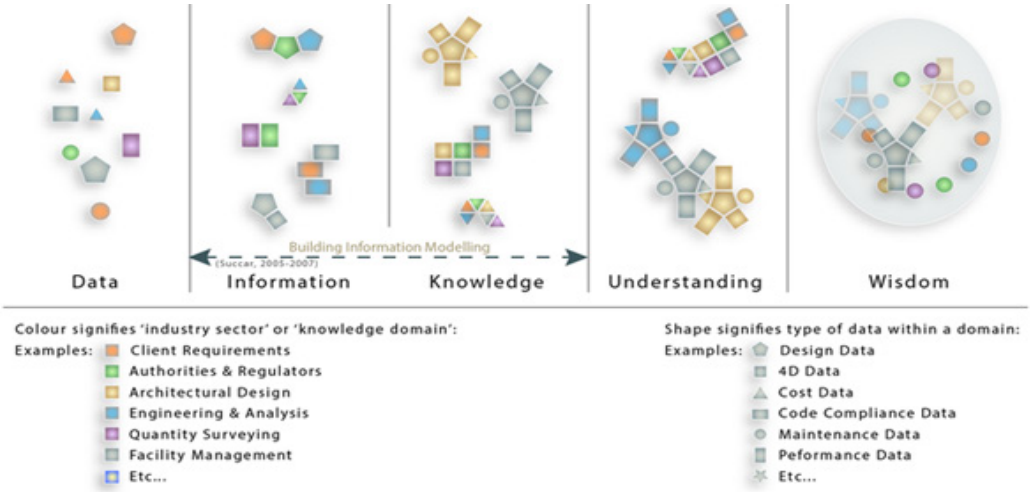


Figure 3.1: The information realm of BIM

References:

[1] Sheil, R. (2004) Design Through Making, In Fabrication: Examining the Digital Practice of Achitecture, Cambridge, Ontario, pp.17

[2] Landauer, C. (1998) Data, information, knowledge, understanding: computing up the meaning hierarchy, In Systems, Man, and Cybernetics, 1998.

[3]http://www.bimthinkspace.com/2005/12/the_bim_episode_1.html

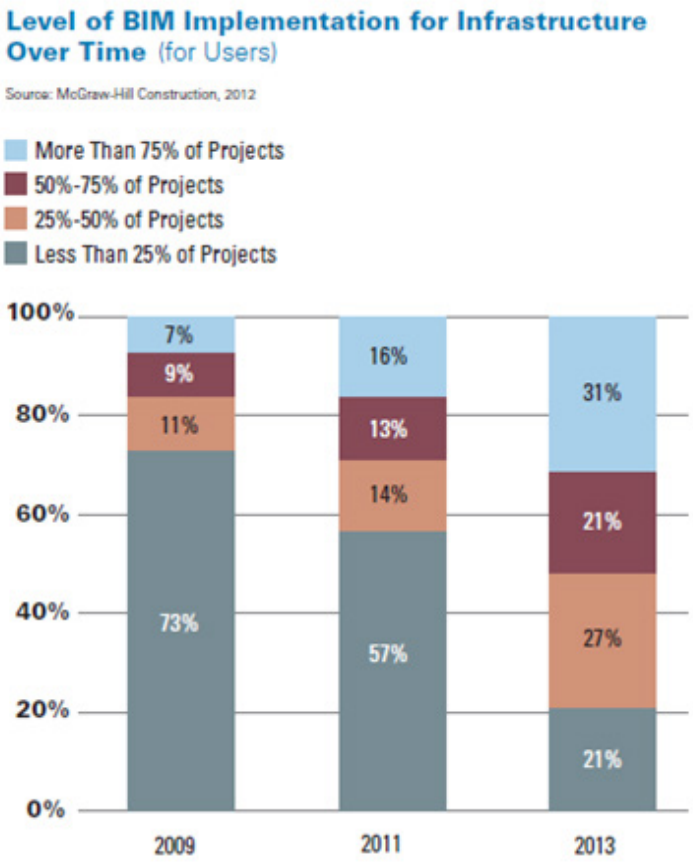
The Current and Expected Value of BIM Implementation in the Construction of Infrastructure Projects

Eng.Ayman Qandeel

Mohamed Ghattas

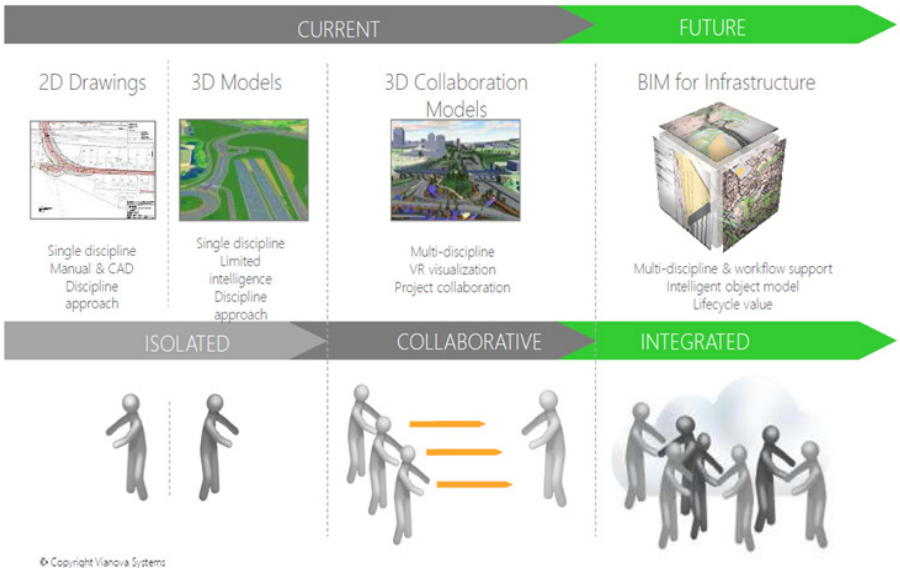
1- Development :

The stages of BIM have undergone many developments starting from two-dimensional drawings which only work in a two-dimensional environment, such as CAD 2D, then three dimensional environment 3D, in which the transition was made to incorporate the third dimension into three-dimensional models, which was known as (Isolation stage) where each specialized team was working separately and there was no cooperation between the disciplines, which led to the need for cooperation between disciplines, resulting in increased visibility and visualization of the design, this stage was called (Cooperation stage), now we are on the threshold of a new and rapid stage called (Integration stage) which supports work flow and and connects all disciplines to each other through smart elements linked with each other throughout the project life cycle, not only single lines.



2- Concept

The following diagram shows the development stages concept and future application.



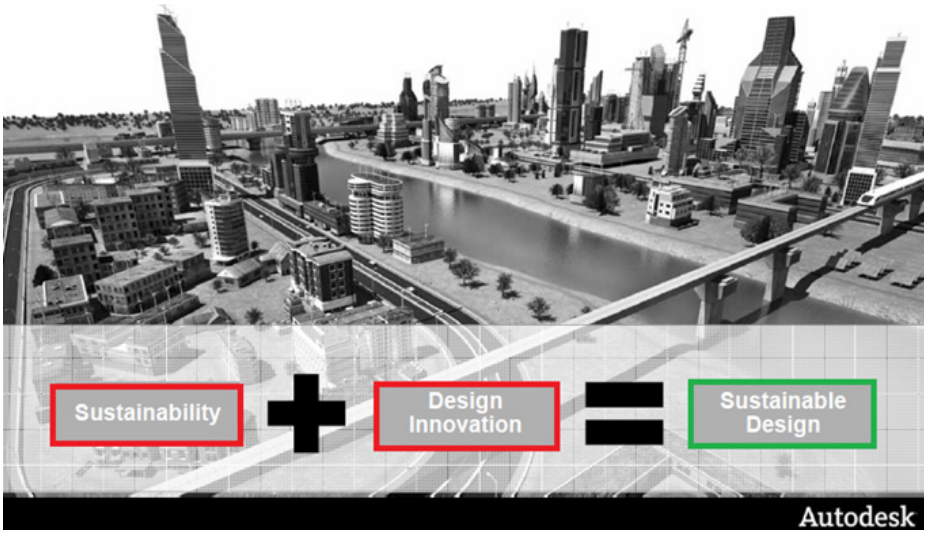
3- Application

For BIM implementation stages, we find the series connected with each other, starting with discovery meeting between all stakeholders of the project in order to clarify the vision and get out with the implementation plan, which through it we can reach the concept of the technical guide or technical proof of concept to get several design proposals to be presented to the owners of the project to obtain the approval of the client, so we can begin the stage of project execution till the closing phase.

4- Sustainability and infrastructure

The concept of sustainability in infrastructure aims to meet the needs of the present time while improving the adaptive capacity of future expectations , which means:

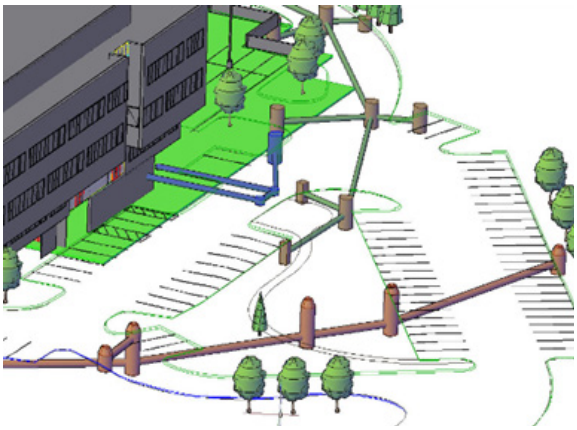
sustainable design = sustainable vision + innovation and development.



4-1 Sustainability and roads

The concept of sustainability in roads is to study how to develop existing road networks, study the future needs to increase the capacity of roads, develop new networks, connect them to each other according to the future expectations of the population growth and the region importance and the expected plans for execution of new cities - universities, schools, train stations and other facilities planned for further development and consider it into account during design.

4-2 Sustainability and drainage



As for the concept of sustainability in drainage and rain, the design should consider rainfall layout, the yearly precipitation rate, peak hours, population density, flood probability, current network condition, development maintenance or replacement potential to be adequate to meet future needs and to be with appropriate absorptive capacity.

- Airports and BIM

Billions of dollars spent yearly in airports construction around the world. Airports are complex buildings as they are based on a number of overburdened facilities, such as passenger buildings, cargo buildings, landing corridors, airways, service corridors, exit and entry points. That make them gain their special criteria, to deal with in BIM environment, in addition to the work packages to be split into a number of stages, all of which are dealt with specialized team and managed in a complex manner compromising the benefit of BIM, as we can deal with a large number of connected data accurately and can be quickly assembled in one project to be clearly presented to client.

In future articles we will review in details the benefits of implementing BIM in projects such as dams, metros, train stations, energy projects and others, citing successful studies in these areas.

BIM-Based Sustainability Analysis
An Evaluation of Building Performance Analysis Software

Salman Azhar and Justin Brown
Auburn University

Rizwan Farooqui
Florida International University

With the rising cost of energy and growing environmental concerns, the demand for sustainable building facilities with minimal environmental impact is increasing. The most effective decisions regarding sustainability in a building facility are made in the early design and preconstruction stages. In this context, Building Information Modeling (BIM) can aid in performing complex building performance analyses to ensure an optimized sustainable building design. In this exploratory research, three building performance analysis software namely Ecotect™, Green Building Studio™ (GBS) and Virtual Environment™ are evaluated to gauge their suitability for BIM-based sustainability analysis. First presented in this paper are the main concepts of sustainability and BIM. Then an evaluation of the three abovementioned software is performed with their pros and cons. An analytical weight-based scoring system is used for this purpose. At the end, a conceptual framework is presented to illustrate how construction companies can use BIM for sustainability analysis and evaluate LEED® (Leadership in Energy and Environmental Design) rating of a building facility.

Key Words: Building performance analysis, Sustainable design, Building Information Modeling, LEED, Green building rating

Introduction

Buildings consume close to 40% of all energy used in the United States and account for 40% of global CO2 emissions (Schueter and Thessling, 2008). The rising cost of energy and growing environmental concerns have pushed the demand for sustainable building facilities with minimal environmental impact through the use of environmental sensitive design and construction practices (Autodesk, 2005). Organizations such as the U.S. General Services Administration (GSA) are increasingly requiring that architects, planners, and constructors meet these energy codes in the delivery of federally owned building facilities. States such as Florida are following suit, requiring all State owned buildings to meet standardized energy requirements (Autodesk, 2008). This type of "green legislation" is increasingly forcing architects, planners, and builders to consider the environmental impact of the buildings they design and construct (Schueter & Thessling, 2008).

The most effective decisions related with sustainable design of a building facility are made in the early design and preconstruction stages. Traditional CAD planning environments, however, do not support the possibility of such early decisions. Energy and performance analysis are typically performed, if at all, after the architectural design and construction documents have been produced. This lack of integration into the design process leads to an inefficient process of retroactively modifying the design to achieve a set of performance criteria (Schueter and Thessling, 2008). In order to assess building performance in the early design and preconstruction phases realistically, access to a comprehensive set of knowledge regarding a building's form, materials, context, and technical systems are required. Because Building Information Modeling (BIM) allows for multi-disciplinary information to be superimposed within one model, it creates an opportunity for sustainability measures and performance analysis to be performed throughout the design process (Autodesk, Inc., 2008; Schueter and Thessling, 2008).

Building Information Modeling (BIM) represents the process of development and use of a computer generated model to simulate the planning, design, construction and operation of a building facility. The resulting model, a Building Information Model, is a data rich, object-oriented, intelligent and parametric digital representation of the building facility, from which views and data appropriate to various users' needs can be extracted and analyzed to generate information that can be used to make decisions and improve the process of delivering the facility (Azhar et al., 2007). BIM uses parametric object modeling technology to create relationships between objects within a virtual building model. These relationships include physical and functional characteristics as well as project life cycle information. A recent research study has indicated that average BIM Return on Investment (ROI) ranges from 634%-1633%, which clearly depicts its lucrative economic benefits (Azhar et al., 2008).

Since 2007 the GSA has required BIM use on all major projects and, although not required at this time, they are encouraging "accurate energy estimates in the design process" (Autodesk, 2008). These regulations, which are often implemented to reduce life cycle costs, can have potentially significant financial implications on design, construction, and operating costs (Autodesk, 2005).

BIM can reduce the costs associated with traditional energy (or sustainability analysis), while also realizing the benefits associated with energy analysis, by "making the information required for sustainable design, analysis and certification routinely available simply as a byproduct of the standard design process" (Autodesk, 2005). BIM provides the opportunity to realize numerous benefits throughout the project conception, design, construction and post occupancy phases of a building facility. Linking the building model to energy analysis tools allows for evaluation of energy use during the early design phases. This is not possible using traditional 2D tools, which require that a separate energy analysis be performed at the end of the design process, thus reducing the opportunities for the early modifications that could improve the building's energy performance.

Research Objectives and Scope

The main objective of this research is to explore the suitability of BIM for sustainability analysis. The sub-objectives include the evaluation of three building performance analysis software types. These include Ecotect™, Green Building Studio™ (GBS) and Virtual Environment™ . In addition to these sub-objectives is the development of a conceptual framework illustrating how construction companies can use BIM for sustainability analysis and evaluate LEED® (Leadership in energy and Environmental Design) rating of a building facility. The research scope is limited to commercial and healthcare building projects.

Methodology

The data for this research is collected via literature, review of software manuals and semi-structured interviews with industry professionals. Holder Construction Company (HCC), Atlanta is a major contributor in this research. HCC is a medium size general contracting company with current annual revenues close to $1 billion. HCC is a market leader in the Southeast regarding the use of BIM technology and won the AGC National BIM award in 2007.

BIM-based Sustainability Analysis

As with traditional physical models and drawings, evaluating building performance based on the graphic representations of conventional CAD or object-CAD solutions requires a great deal of human intervention and interpretation, which renders the analysis too costly and/or time-consuming (Autodesk, 2005). A survey conducted by the Center for Integrated Facility Engineering (CIFE) at Stanford University cited that economic reasons are among the primary causes for not implementing sustainable design and construction procedures by the majority of survey respondents (CIFE, 2004).

A Building Information Model represents the building as an integrated database of coordinated information. Beyond graphically depicting the design, much of the data needed for supporting sustainable design is captured naturally as design of the project proceeds. In addition, the integration of Building Information Model with Performance Analysis tools greatly simplifies the often cumbersome and difficult analysis. This approach gives architects easy access to tools that provide immediate feedback on design alternatives early on in the design process.

Krygiel and Nies (2008) indicated that BIM can aid in the following aspects of sustainable design.

- Building orientation (to select the best building orientation that results in minimum energy costs) Building
- Massing (to analyze building form and optimize the building envelope)
- Daylighting analysis
- Water harvesting (to reduce water needs in a building)
- Energy modeling (to reduce energy needs and analyze renewable energy options such as solar energy) Sustainable
- Materials (to reduce material needs and to use recycled materials)

For projects pursuing LEED® certification, many LEED® credits require that drawings be submitted to support the qualification for credit. Although most of these drawings can be prepared using conventional CAD software, BIM software produces these drawings more efficiently as part of the building information model and have the added advantage of parametric change technology, which coordinates changes and maintains consistency at all times. Thus, the user does not have to manually update drawings or links. Similarly, such models carry a wealth of information for many other aspects of sustainable design and/or LEED® certification. For instance, schedules of building components can be obtained directly from the model to determine percentages of material reuse, recycling, or salvage. In addition, advanced visualization techniques can convince skeptical clients that green design performs well and looks good. According to Autodesk (2005), up to 20 points for LEED® certification can be facilitated using BIM.

Building Performance Analysis Software: A Case Study

The rationale of this evaluation is to gage the suitability of leading building performance analysis software for BIMbased sustainability analysis. The three software types selected for this purpose were Ecotect™, Green Building Studio™ (GBS) and Virtual Environment™. Holder Construction Company (HCC) acquired these software and the analysis was performed by their BIM division. The project selected for this purpose was Emory University's Psychology Building (Figure 1) which received a LEED® Silver certification. BIM was used in the early design phase to determine best building orientation, evaluate various skin type design options such as masonry, curtain wall and window styles, perform energy and daylighting analysis, and create a LEED® daylighting credit qualification report.

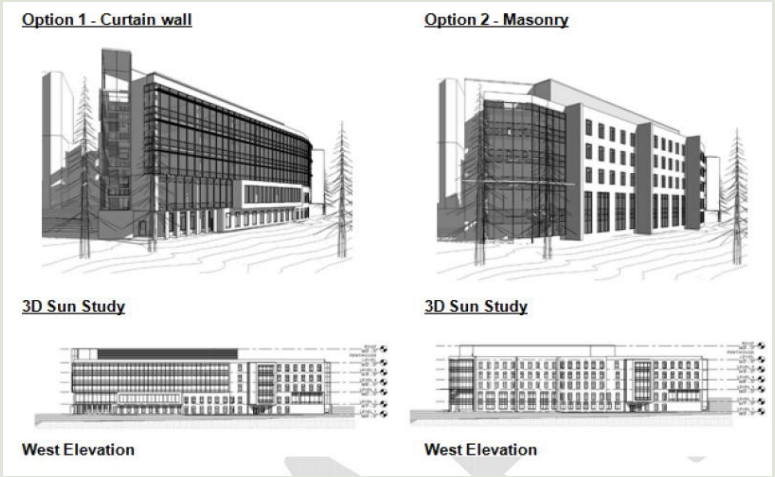


Figure 1: Use of BIM for Options Analysis and Sun Studies in the Emory Psychology Building

(Courtesy of: Holder Construction Company, Atlanta, GA)

Figure 2 depicts the process of BIM and Building Performance Analysis Software integration by outlining various data transfer steps. The boxes on the right hand side indicate software features evaluated in this analysis.

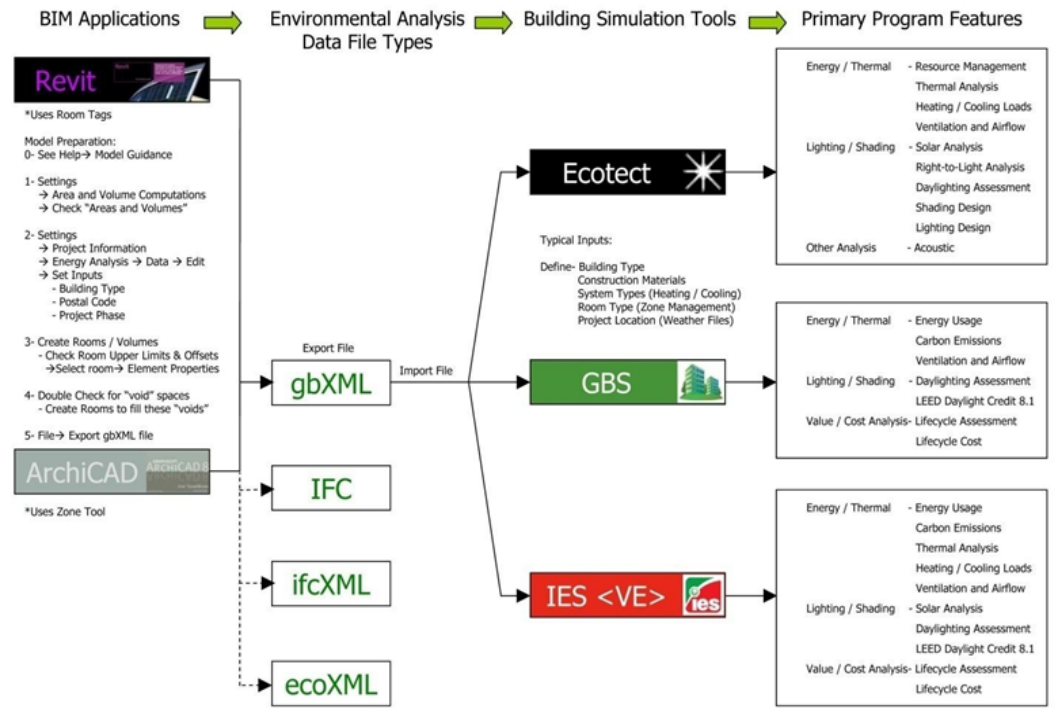


Figure 2: Integration of BIM and Building Performance Analysis Software
(Courtesy of: Holder Construction Company, Atlanta, GA)

The following paragraphs briefly discuss each software and their respective “pros” and “cons”.

Ecotect™

Ecotect™, owned by Autodesk, Inc., is “a complete building design and environmental analysis tool that covers the full range of simulation and analysis functions required to truly understand how a building design will operate and perform” (Autodesk, 2008). The primary program analysis capabilities include energy analysis, thermal analysis, and lighting/shading analyses. The energy and thermal analysis features take into account factors such as resource management, heating and cooling loads, and ventilation and airflow. The lighting/shading analysis tools allow for solar analysis, right-to-light analysis, daylighting assessment, shading design, and lighting design. Ecotect™ also allows for other building facility assessments such as acoustic analysis. Figure 3 depicts the performance analysis of Emory Psychology building using Ecotect™ with its “pros” and “cons”.

Green Building Studio™ (GBS)

Green Building Studio™, also owned by Autodesk Inc., is a web-based energy analysis service that allows users to evaluate the environmental impact of individual building components early in the design process. The software's primary analysis capabilities include energy and thermal analysis, lighting and shading analysis, and value/cost analysis. The energy/thermal analyses evaluate energy usage, carbon emissions, and ventilation and airflow. The lighting and shading analyses assess daylighting and include the LEED® Daylight Credit 8.1 feature. The value and cost functions determine lifecycle assessments and lifecycle costs. Figure 4 shows the performance analysis of Emory Psychology building using GBS™ with its "pros" and "cons.

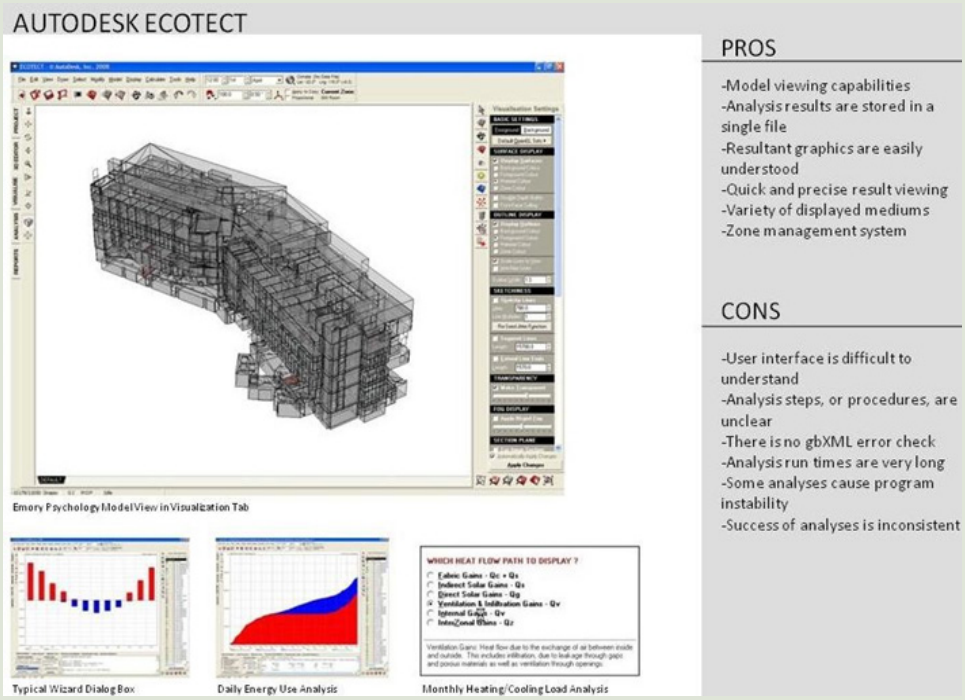


Figure 3: Ecotect™ "Pros" and "Cons" (Courtesy: HCC, Atlanta, GA)

Virtual Environment™

Integrated Environmental Solutions' Virtual Environment™ software is a suite of integrated building performance analysis tools. These tools provide analyses for issues including solar, lighting, energy, costs, egress, and many others. The energy/ thermal functions include energy usage, carbon emissions, thermal analysis, heating/ cooling load evaluation, and ventilation / airflow evaluation. The lighting / shading functions include solar analysis, daylighting assessment, and LEED® Daylight Credit 8.1 capabilities. The value/cost analysis functions include lifecycle assessment and lifecycle cost. Figure 5 illustrates the performance analysis of Emory Psychology building using VE™ with its "pros" and "cons.

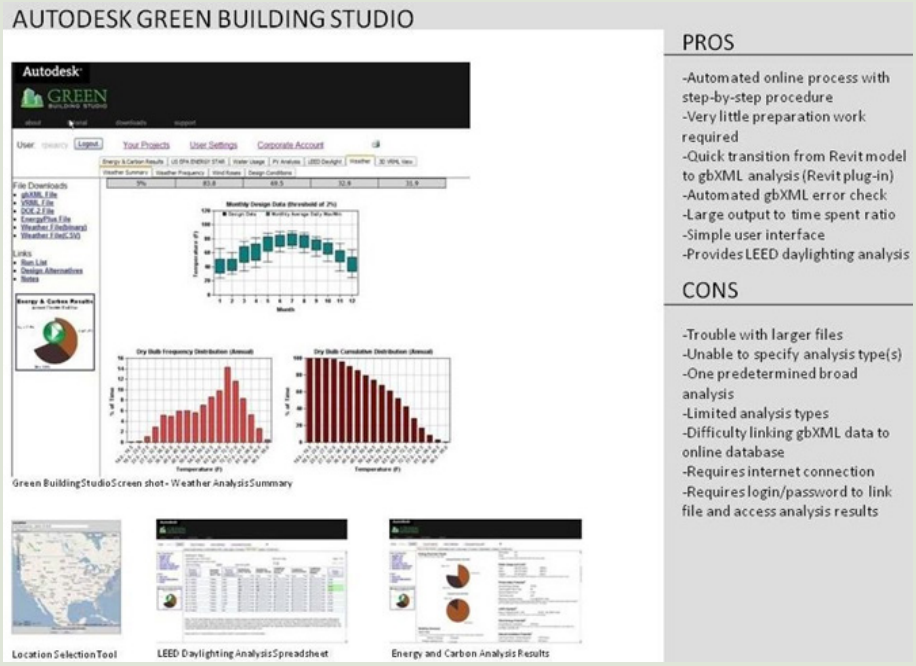


Figure 4: Green Building Studio™ "Pros" and "Cons" (Courtesy: HCC, Atlanta, GA)

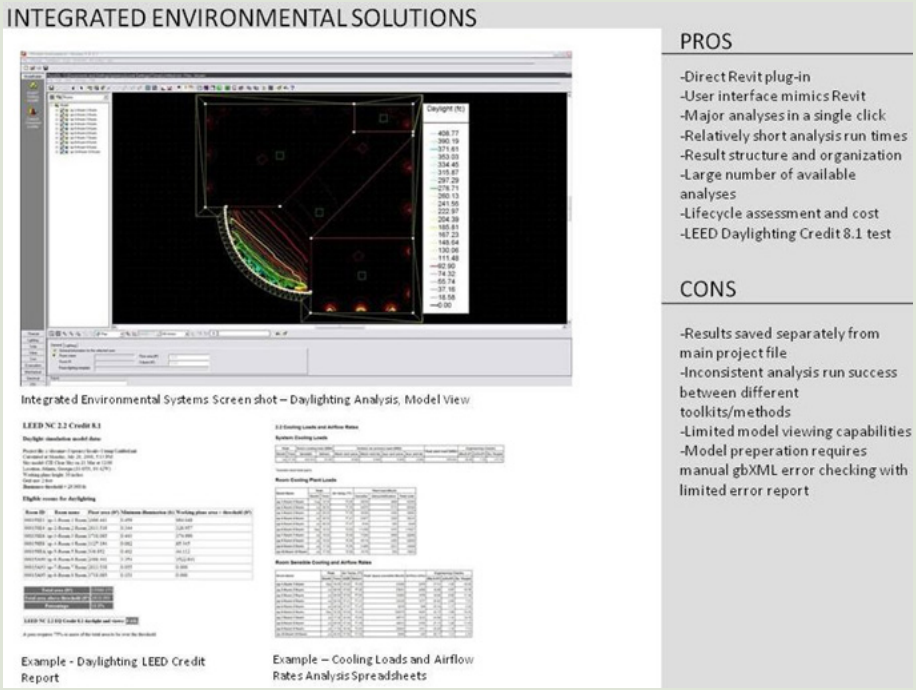


Figure 5: IES Virtual Environment™ "Pros" and "Cons" (Courtesy: HCC, Atlanta, GA)

Evaluation of Building Performance Analysis Software

To evaluate the performance of these software for various types of sustainability analysis and to select the best software, an analytical analysis was performed. A check list of various sustainability features (with regard to LEED® rating) was prepared. Each feature was assigned a weight factor which represents its importance within the given features. These weight factors were subjectively decided by a team of BIM and LEED® experts in the Holder Construction Company based on their experience. After that, the same team evaluated these features in each software and gave them a ranking score between 1 to 10.

Then the total weighted score was calculated as follows:

Total Weighted Score = Σ (Ranking score for each feature) x (Weight factor of that feature)

As shown in Table 1, the IES's Virtual Environment™ got the maximum score and hence may be considered as the best software for BIM based sustainability analysis.

Table 1: Building Performance Analysis Software Evaluation Matrix (Source: HCC, Atlanta)

Sustainable Design Features	(Weighting (1-10	™Ecotect	™GBS	™VE
Energy	6			
Energy Usage		1	3	3
Carbon Emissions Calculations		3	3	3
Resource Management		3	1	0
Total Score		**7**	**7**	**6**
Thermal	7			
Thermal Analysis		3	1	3
Heating / Cooling Load Calcs		3	1	3
Ventilation and Airflow		3	3	3
Total Score		**9**	**5**	**9**
Solar				
Solar Analysis	2	3	1	3
Right-to-Light		3	1	1
Total Score		**6**	**2**	**4**
Lighting and Daylighting	3			
Daylighting Assessment		3	1	3
Shading Design		3	1	1
Lighting Design		3	1	1
Total Score		**9**	**3**	**5**
Acoustic	2			
Acoustic Analysis **Total Score**		3 **3**	0 **0**	1 **1**
Value and Cost	8			
Lifecycle Assessment		0	3	3
Lifecycle Cost		0	1	3
Total Score		**0**	**4**	**6**
LEED	8			
LEED Integration Tools **Total Score**		0 **0**	1 **1**	1 **1**
Total Weighted Score		**150**	**130**	**180**

A Conceptual Framework for BIM-based Sustainability Analysis

A conceptual framework for BIM based sustainability analysis during different stages of a project life cycle (or project phases) is illustrated in Figure 6. The left hand side box indicates the various project phases (or construction company departments). The middle box depicts the various sustainability analysis features while the right hand side box indicates the interaction of external stakeholders (such as customers or project partners) in sustainability analysis. This framework can be used by the construction companies who want to perform BIM-based sustainability analysis. Please note that this conceptual framework is still in its infancy stage. As this is an on-going research project, it is hoped that this framework will be further refined and validated.

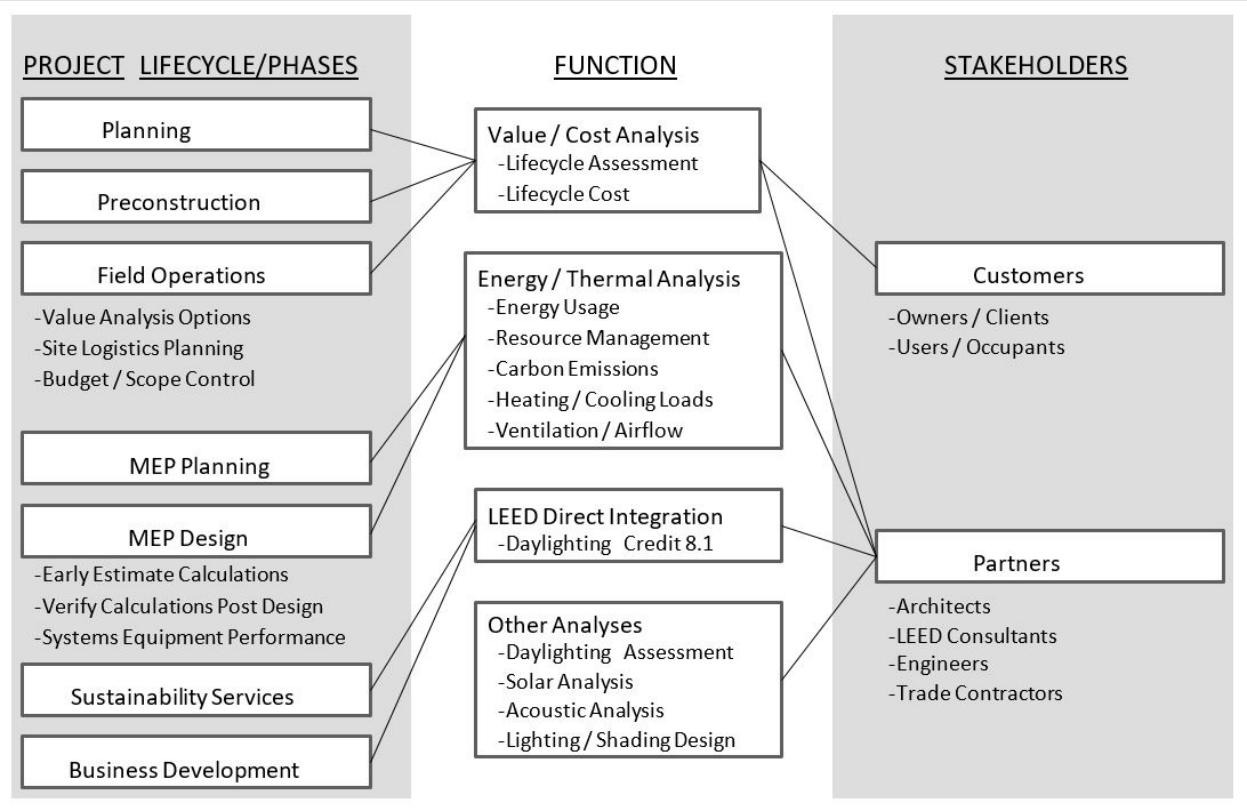


Figure 6: A Conceptual Framework for BIM-based Sustainability Analysis

Concluding Remarks

This exploratory study indicates that BIM can facilitate the very complex processes of sustainable design such as daylighting and solar access, as well as automate the drudgery of activities like material takeoffs, cost estimation and construction schedules while capturing and coordinating information into a single integrated model. Based on the evaluation of three building performance analysis software, it was found that Integrated Environmental Solutions' Virtual Environment™ software appears to be both the most versatile and powerful in terms of analysis capabilities.

Ecotect™, although stronger than Green Building Studio™ in numerous categories, including Thermal, Solar, and Lighting and Daylighting, is apparently the least versatile of the three. This is due to its lack of Value and Cost and LEED® capabilities, both heavily weighted items in our analysis. Green Building Studios™, by Autodesk, received the

lowest overall score. However, it appears to be more versatile program than Ecotect™, lacking only in Acoustic capabilities. The results produced from the three software (namely Ecotect™, IES-VE™ and GBS™) have not been directly validated against DOE Energy Plus™ software. However, one of these software, GBS™, is based on the DOE-2 engine. The comprehensive GBS™ error check report helped reduce the number of errors while creating a useable gbXML file. Therefore, the authors are confident that the results are 'in the ballpark'. Meanwhile, though Ecotect™ and IES-VE™ are not based on the DOE-2 engine, they provide inputs that allow users to define materials, room types, system types, etc. for more detailed study within the programs. This study was limited in scope and involved professionals from one company only; hence it may have overlooked several factors. The study is expected to be completed in summer 2009 and authors plan to publish complete findings in the ASC journal.

Disclaimer

The opinions and recommendations expressed in this paper are the authors' personal opinions and do not necessarily represent the official position of any organization. This research does not endorse any software in any capacity.

Acknowledgements

The authors would like to express their gratitude to Mr. Paul Hedgepath, Senior BIM Engineer, Holder Construction Company, Atlanta, GA for providing necessary data and feedback. This study is supported by the CADC 2008 Seed Grant provided by the College of Architecture, Design and Construction at Auburn University, Auburn, Alabama.

References

Autodesk, Inc. (2005). Building Information Modeling for Sustainable Design. Autodesk, Inc. White Paper, Available online at www.autodesk.com.

Autodesk, Inc. (2008). Improving Building Industry Results through Integrated Project Delivery and Building Information Modeling. White Paper, Available online at www.autodesk.com.

Azhar, S.; Nadeem, A.; Mok, J.Y.N.; and Leung, B.H.Y. (2008). "Building Information Modeling (BIM): A New

Paradigm for Visual Interactive Modeling and Simulation for Construction Projects." Proceedings of the First

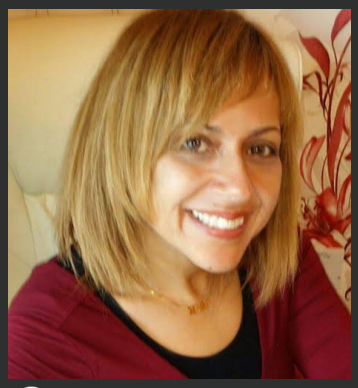
International Conference on Construction in Developing Countries (ICCIDC-I), August 4-5, Karachi, Pakistan. Azhar, S., Hein, M., and Sketo, B. (2008). "Building Information Modeling (BIM): Benefits, Risks and Challenges". Proceedings of the 44th ASC Annual Conference (on CD ROM), Auburn, Alabama, April 2-5, 2008.

CIFE. (2004). A Survey on the Needs for Sustainable Design, Available online at www.stanford.edu/cife.

Kriegel, E., and Nies, B. (2008). Green BIM. Indianapolis: Wiley Publishing, IN.

Schueter, A., and Thessling, F. (2008). "Building Information Model Based Energy/Exergy Performance

Assessment in Early Design Stages". Automation In Construction (unpublished paper, available online)



Dr: Noha Saleeb
Amira Elshazly

BIM Projects' Risk Management and Assessment (1)

Introduction:

The accuracy of the project's risk assessment is one of the most important factors to indicate the success or failure of any construction project and the way to deal with it. The entry and developing of Building Information Modeling (BIM), risk assessment and management methods have taken a new dimension in addition to the traditional methods of doing so.

In this issue will cover the following:

- The general methods to deal with risk in any project using BIM

or in any BIM based/ enabled construction project

In the next issue, we will discuss the following:

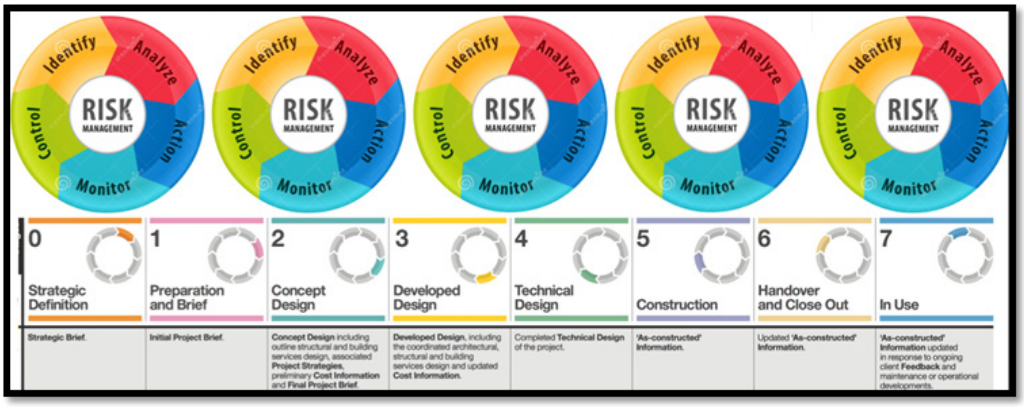
- Detailed risk types in BIM based/ enabled construction project's life cycle and treatment suggestions.

Risk definition according to the British standards BS 6079 (1996) "It is the **uncertainty** inherent **in plans** and possibility of something happening that can affect the prospects of achieving **business or project goals**"

While risk management is the process of identifying the risk then analyze it then taking a treatment action, then monitoring and evaluating the treatment

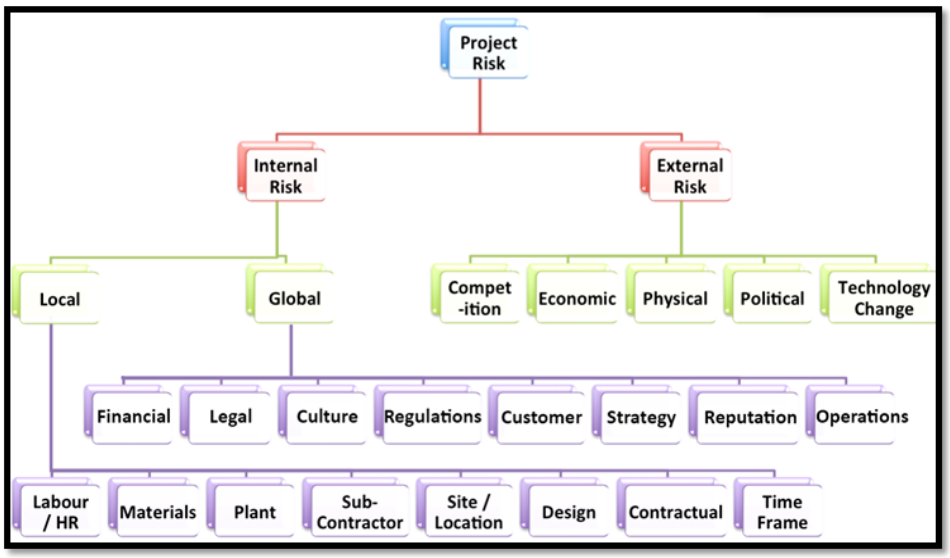
identify ⟶ **analyze** ⟶ **action** ⟶ **monitor** ⟶ **evaluate/control**

These processes should be done periodically during the project life cycle, from the beginning of each project stage (concept, design, construction, maintenance) and not only in the beginning of the project.



Systematic Process of Risk Management across the Project Lifecycle

Risk types can be divided in sequentially, starting by dividing them into 2 main categories: internal project's risks and external project's risks. As shown in the below figure. The internal risks can be divided into local and global risks. While external risks can be divided into, risks related to financial issues (lack of regularity or budget), administrative (mistakes, negligence, lack of experience in decision-making or tasks implementation), legal (intellectual property rights, tender contract gaps), culture (differences in work methods and ethics), and political (international laws and agreements. The internal project's risks include the lack in resources (human, materials, machines, tools, money, permits), schedules' disruption, lack in communication between teams (design, construction), and site problems etc. Therefore, it is important to list the types and categories of the main risks that affect the project from the beginning of the project and the details of these risks in order to assess their intensity and impact on the project and determine the appropriate way to deal and manage them.



Hierarchical Risk Categories involved in a Project

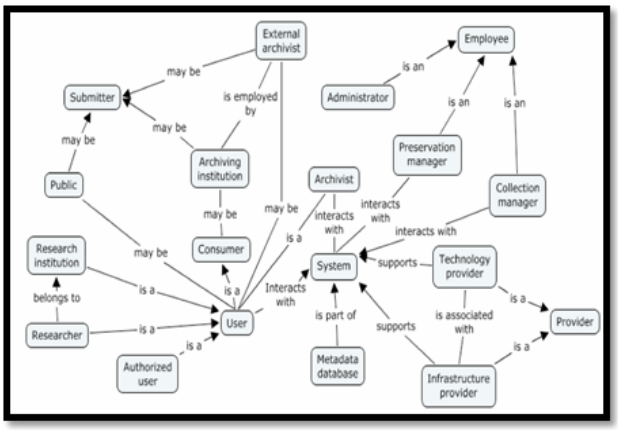
Risk management:

As mentioned above, the risk management process is summarized in four steps:

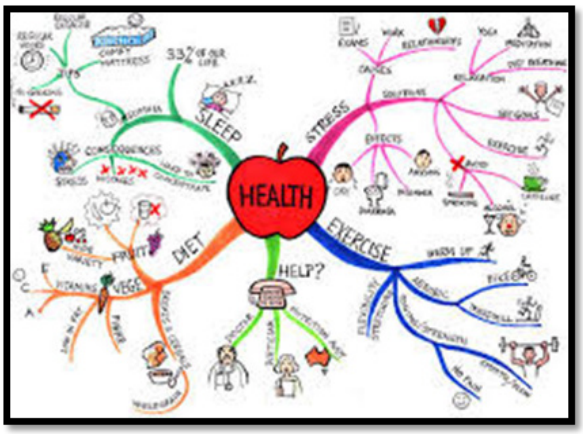
identify ⟶ **analyze** ⟶ **manage(action)** ⟶ **evaluate(monitor)**

1. For identifying the risks types, the following tools can be used:

- Brainstorming or mind mapping: a graph is drawn to include the branches and relationship between the different risk types. It is a common method and the most used one.

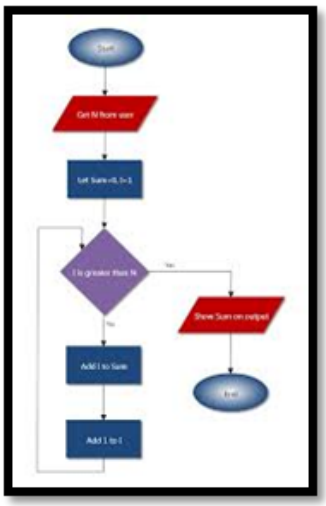


Mind-mapping

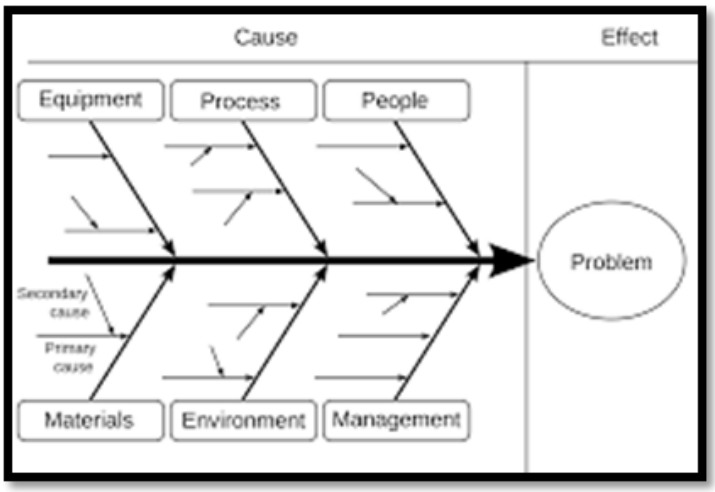


Brainstorming

- Ishikawa Cause and Effect (Fishbone diagram): it is similar to the previous method, but reviews the risks' causes and their effect.
- Workflow Flowchart: this chart analyzes the risks that lead to other risks and the consequent activities or tasks.

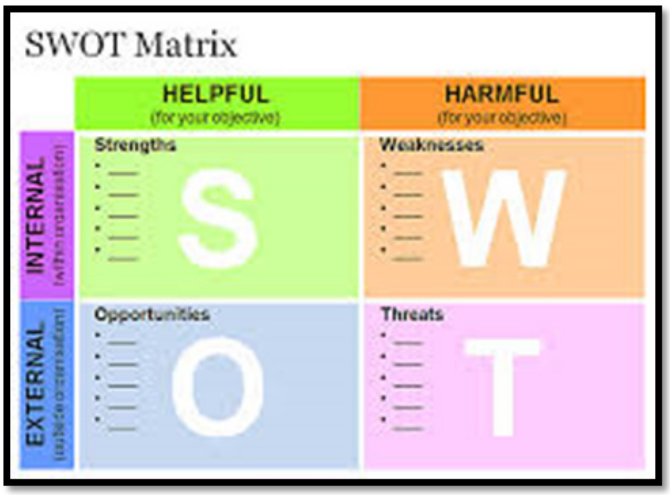


Ishikawa Fishbone Diagram



Flowchart

SWOT matrix: where the strengths and weaknesses of the project analyzed, and some of them could be risks in the project. The opportunities in the project that can be used now or in the future. The project's threats which are often source of risks in the project.



2- Risks' types analysis: two characteristics for each risk should be identified (likelihood of risk, severity of risk). A risk register matrix is then formed as shown, divided into five degrees for each likelihood and severity. After that, each risk placed in its appropriate degree. Built on that, the final risk importance = likelihood * severity. The higher the degree of importance, the more this risk becomes a priority to deal with.

Delay+additional cost=	90%	70%	50%	30%	10%
Severity / Likelihood	Threaten to life (5)	Very serious (4)	Serious (3)	Not too serious (2)	Not serious (1)
Most likely (5) >90% chance	High (25)	High (20)	High (15)	Moderate (10)	Low (5)
Likely (4) 70-90% chance	High (20)	High (16)	High (12)	Moderate (8)	Low (4)
Moderately likely (3) 50-70%	High (15)	High (12)	Moderate (9)	Moderate (6)	Low (3)
Unlikely (2) 30-50% chance	Moderate (10)	Moderate (8)	Moderate (6)	Low (4)	Low (2)
Very Unlikely (1) <30% chance	Low (5)	Low (4)	Low (3)	Low (2)	Negligible (1)

11+	Needs Immediate Remedy
6 – 10	Needs Action Reduction
1 – 5	No Action Monitor

Risk Register

The following points are very important in creating a risk log:

- Discuss and revise the log with the supervisors and the employees.

  Are the risks and its treatments clear and agreed on?

- Review and search for the risks' history and their treatment methods.

  The results of that in internal projects and external projects in the construction industry.

- Verify the realism of the evaluation and treatments

  May the severity or likelihood degrees be changed because of any unexpected future circumstances and factors.

  It is important to revise the risk register at the beginning of each stage in the project life cycle or when the management is assigned to a different team.

3- Risks treatment: after identifying the types of risks and analyzing there importance and ranking them according to their priority in dealing with them, there are five basic ways to risk management:

- Avoiding: develop rules and systems from the beginning of the project to avoid the risk from its source like contracting by using the Integrated Project Delivery (IPD) method, where all parties share the gains and losses. Therefore, the chance of problems almost disappeared; for example, item like paying payments do not cause almost any problem because everyone will be affected.

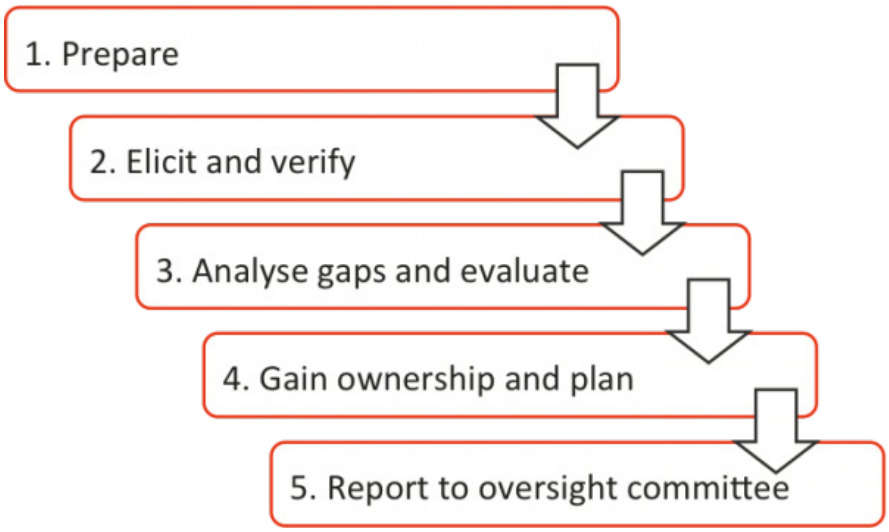
Risk Management Methods

- Elimination: find a way to permanently eliminate the risk such as putting precise determinants and penalties in the contract to organize the financial payments or making periodical meetings between the stakeholders from the beginning of the project, as it is required in the BIM projects to clarify all of the issues related to the project (collaboration).
- Reduction: finding ways to reduce the severity of losses that may result from a risk like the use of local or international arbitration, but that does not suit the BIM principals to be followed by cooperation and collaboration.
- Retention: a way to treat the risk effect on the project's parties internally, like agreeing to create insurance policy or bank guarantee to reduce or recover financial losses, but after deducting premiums.

- Sharing/ Distribution: it is possible to use external party or organization to participate in sharing risk losses, in return for benefiting from the building services in the future. The IPD can be considered as a kind of risk sharing , where the losses divided among the stakeholders.

4- Finally to assess risks treatment:

- Identify the degree of success of the implemented solution using the key performance indicator such as identifying the percentage of deliverables delay in schedules and shares compared to the previous ones.
- Identify the gaps in the current solution and the responsible for any previous failure and the party or the team who is responsible to find and implement a new solution. (Gain ownership for risk management).
- Develop a plan with a new or alternative solution (Plan and report).
- Take the required agreements for implementation. (Signoffs from risk or management committee/ department).



Goodbye in the next issue to complete the detailed risk types in any construction-building life cycle uses BIM and treatment suggestions.

Go BIM!!

Written by: Himani Shah

Its important to adopt "BIM" as a mindset and more than just a process to follow.

"BIM shouldn't be considered as a replacement to any traditional construction practice.

It's just learning how to use Revit or Archicad, Navisworks or Solibri or any software to model, coordinate and work out the details."

Goal is modeling the entire design virtually before constructing it on site and embed all available information in it, facilitating coordination for all parties involved and letting them stay in touch at any point of time during and after completion of the project.

It is important to understand the role of a simple 3D object that you are creating today, how it will be modified, developed as per LODs, carry the information in future and how that will be used for visualizing the element and its effects on the surrounding objects and entire building system, which will facilitate the coordination, quantity takeoff, scheduling during construction.

It's a mindset promoting efficiency which is not limited only to 3D visualization experience but also to deliver data and information along with that 3D model which can be utilized for the entire life cycle of the building.

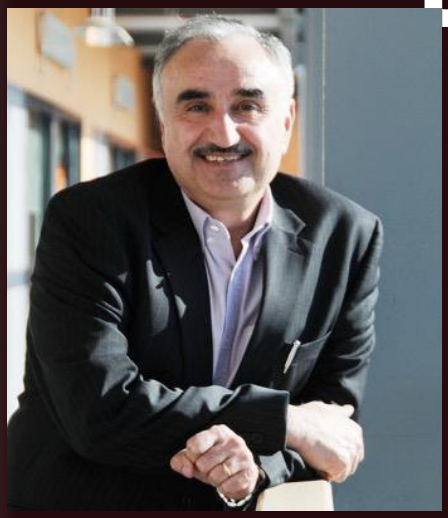
When it comes to the over all cost, its difficult to quantify BIM as a part of Hard or Soft costs.

But looking to what BIM can facilitate to a project implementation and progress like solving conflicts, reducing amount of rework on site, interdisciplinary coordination, information exchange and storage, scheduling and forecasting supply of resources, cost control and estimation, gives us an idea that it will impact the overall cost of the project in a positive way.

Aim is to go digital at every stage from concept to construction to maintenance, by incorporating BIM in to the project and believing in the benefits it will reap in future.

Whole Lifecycle Information Flow Underpinned by BIM in Qatari Construction Industry: The 'Project DNA' Concept

second Part



Dr. Nashwan Dawood

EIR uses mostly UK construction vocabulary which cannot be translated to other countries like Qatar. However, it constitutes an excellent start for identifying projects characteristics and the way in which information is organized and coordinated. In a study conducted by the author and partly reported in Hafiz, et al 2015, gaps and issues related to applying UK developed EIR in Qatari construction industry have been identified. These are:

- ● Lack of knowledge and understanding of WLC information value in construction projects. There is a need for a substantial work in this work to develop a universal definition of all aspects of WLC and BIM terminologies.
- ● Terminologies used in EIR are not compatible with Qatari construction industry.
- ● Contractual arrangements and strategies have major impact on EIR and Qatar has unique sets of contracts that are quite different from the UK.
- ● Standard processes are not sufficiently developed and more work is needed in this area.
- ● Models and document ownership and intellectual property issues are not well developed and vary across the construction industry.

3. PROJECT 'DNA', THE CASE FOR QATAR

The construction industry in Qatar, as the case with the European and American construction industries, is not immune to delays and costs overruns. Al Jurf and Beheiry (2010) interviewed 15 grade 'A' contractors operating in Qatar and found out that time and cost overruns are not unusual on both small and large projects. Qatar is expecting to witness tremendous growth following their winning bid to host the FIFA World Cup in 2022. According to a five-year forecast by Ventures Middle East, Qatar's construction sector which contributes 7.2 per cent to the economy (2009), is expected to spend around $100 billion on construction projects in the next four years (IQPC, 2011). Therefore, the possibility of savings on such a large volume of construction is enormous. In addition to the savings that can be achieved through the implementation of BIM, new scenarios such as comparing design alternatives for aspects such as buildability, sustainability, structural, spatial configuration can be enabled with BIM. This matches fully with the current needs of Qatar. For example, with regards to sustainability, the need for sustainable and green building solutions in Qatar has never been greater than it is today according to the Qatar National Vision 2030 (MDPS, 2013); as such Qatar's construction industry is looking for technologies and techniques that can enable more sustainable practices. A recent BIM survey conducted in Middle East (including Qatar) by buildingSMART showed that the BIM usage is around 25% and the level of competency is underdeveloped compared to regions such as Western Europe. The authors of this paper are embarking on a major research project funded by Qatar Foundation to develop whole life cycle information protocols for Qatar construction industry. The project is at an early phase and early results showed that there are major developments needed in processes, polices and people.

It is hypothesized in this paper that project 'DNA' concept for WLC composed of four pillars: People, Processes, Policy and Technology, and it is dubbed as the 3P+T model. These pillars have been developed through 4 seminars and brain storming sessions that started in 2013 and run over 6 months interval (the 4 seminars and their related outcomes are reported in www.bimuserday.com). In each seminar, one of the pillars was introduced and discussed by experts in Qatari construction market. Each seminar was attended by at least 100 practitioners. Ingredients for each pillar are given in figure 4 which were extracted for the four seminars. The following briefly introduces the four pillars:

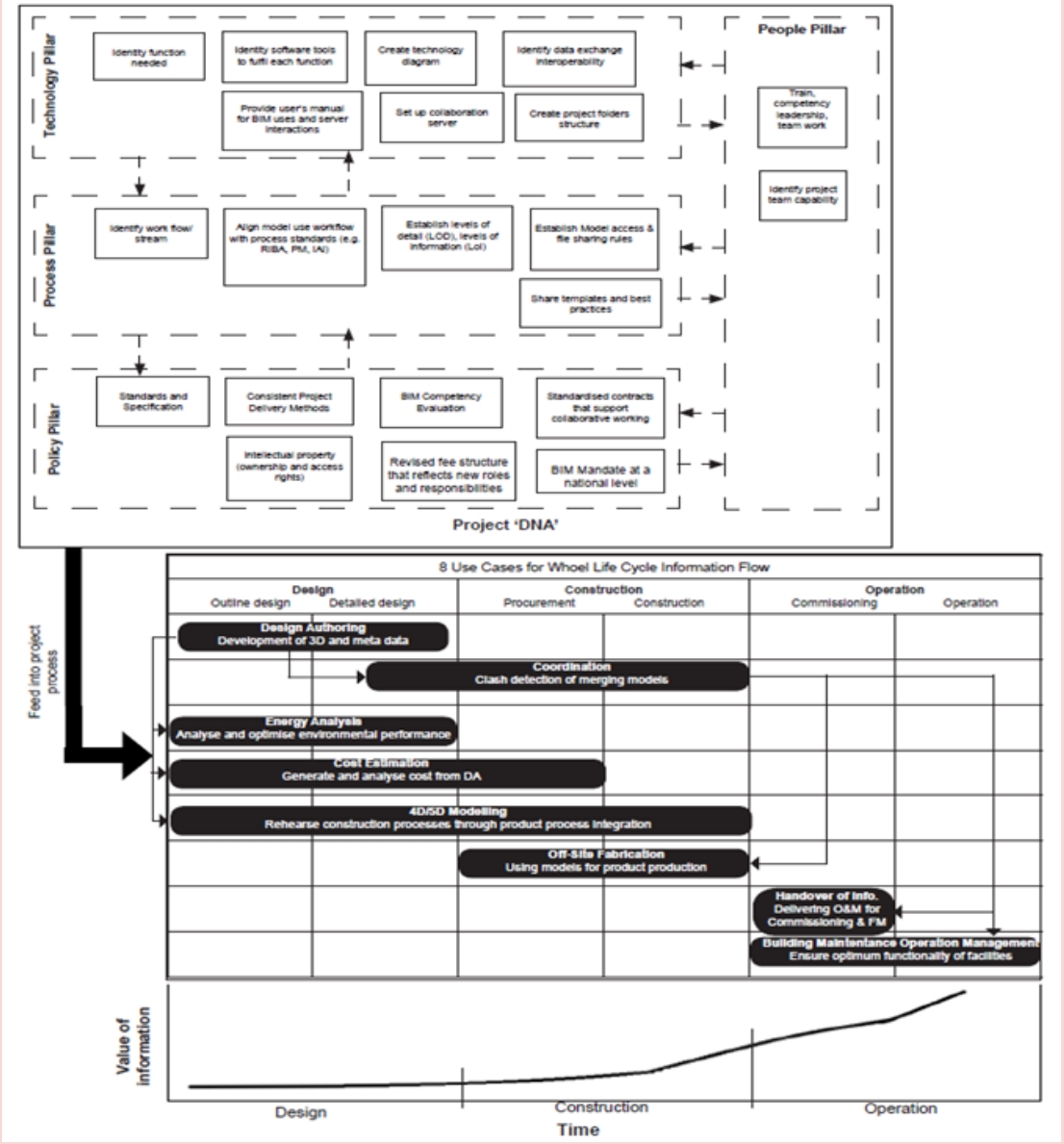


Figure 4, Four pillars of WLC, 3P+T and potential uses cases for implementation

The process pillar includes identifying and standardising different work streams for each construction process and their interactions with different construction stage and supply chain roles and responsibilities. Processes to include: Identify work streams and provide standards/manuals for each stream. For example, design authoring, cost estimation and control, planning and building regulation approvals, energy assessment and calculation, construction planning and monitoring control, etc. Work streams to be mapped onto construction stages.

Establish level of details (LOD) and level of information (LOI) for each process and in each stage. AIA standards to be adopted and used in a formalised way. Document processes using different presentation format and templates to facilitate adoption.

The policy pillar shows a number of processes that needs to be developed at project, company, sector, regional and country levels. These processes include: Establish modelling standard, this can include adoption and localisation of BS 1192:2007 or other related available standards.

Contractual arrangements and the use of standard forms of agreement related to model or 'partial' model ownership. Also, this will include identifications of roles and responsibilities of developing and re-using information. This is of particular importance as adding value to information produced in proceeding processes should assume that information is accurate and the new value to be added is the responsibility of the actor 'or a person' who contribute to this.

The Technology Pillar includes all processes related to: identify functions needed, identify software tools, identify data exchange interoperability, create project folders structure, provide user manuals and where applicable, set up collaboration server.

The people Pillar to include training, competency assessment standards for both, people and organizations, leadership, teamwork and others. The people pillar cut cross all three other pillar as technology, processes and policy will not operate properly unless you have a well-trained and developed human resources. Bilal Succar, et al 2013 presented a comprehensive BIM competency assessment focusing on individual BIM competencies. They presented an approach and taxonomies to filtered, classify and aggregate individual competency into see competency inventory. The author are in process of adapting such an approach to the Qatar and results will be published in a separate report.

Figure 4 also show the 8 business process cases in which project 'DNA' is being modelled and tested. These are: Design Authoring, Coordination, Energy Analysis, and Cost Estimation, 4D/5D modelling, on site fabrication, commissioning and Building Information Maintenance. Real life case studies are being used to develop detailed business processes underpinned by information technology. Also, figure 4 shows the growth of the value of information in a project throughout the 8 business processes. In is anticipated that if this approach has been utilized, there will be a zero drop in information value as project passes through different stages and from one process to another and an accumulated value will assist the industry in improving its efficiency and present cost escalation.

4. MATURITY MODELS

In order to identify the extent to which construction industry in Qatar can adopt the 3P+T model and he expected value proposition, a theoretical maturity model has been developed and mapped onto current industrial practices in Qatari construction industry. The maturity model (see figure 5) was inspired by the Capability Maturity Model Integration (CMMI) developed by Carnegie Mellon University (Paulk et al., 1999). It proposes a framework for organising the evolutionary steps into five maturity levels that lay successive foundations for enabling a lifecycle information flow across construction projects.

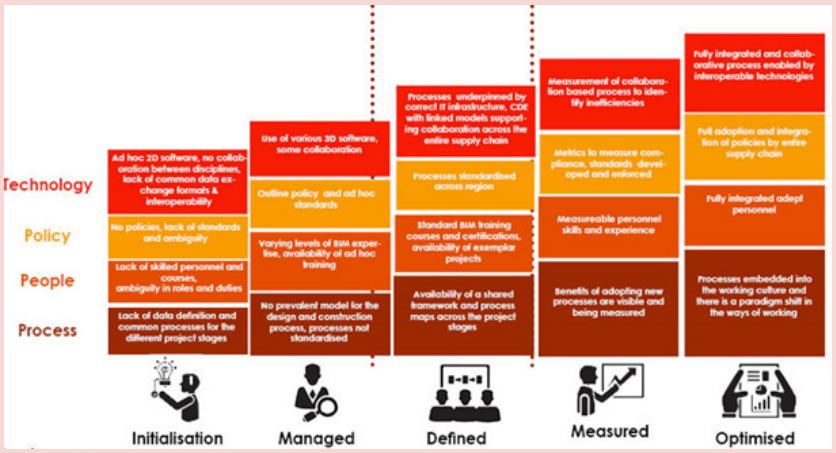


Figure 5, Maturity model of 3P+T concept

These five maturity levels define a scale for measuring the maturity of an organisation's WLC capability and readiness. Each maturity level is described as the combination of a number of project 'DNA' elements that make up the 3P + T pillars (Policy, People, Process and Technology). In order to progress from one level to another, it is essential to improve in the different dimensions that make up the pillars, resulting in an increase in the organisations' capabilities to adopt 3P+T model. The five stages of the maturing model are:

1. Initialisation
2. Managed
3. Defined
4. Measured
5. Optimised

4.1 **Initialisation**

Processes are ad hoc, undefined and usually chaotic. The outcomes of the processes are unpredictable, often exceeding allocated budget and timelines. Success depends on individual effort and is often unrepeatable.

4.2 **Managed**

Basic processes are established to track schedule and functionality. The necessary process discipline is in place to repeat earlier success on projects with similar applications. Processes are managed but not standardised across projects and can vary considerably in each specific instance of the project.

4.3 **Defined**

The process for management and technical activities is documented and standardised for the organisation. These standard processes are used to establish consistency throughout the organisation. Projects establish their specialised processes by modifying the standard processes to fit their needs and requirements, while still keeping to the standard frameworks defined by the organisation.

4.4 **Measured**

Process quality and performance are measured to achieve visibility and predictability. The performance of processes is controlled using statistical and other quantitative techniques, and predictions are based on statistical analysis of process data.

4.4 **Optimise**d

Continuous process improvement enabled by quantitative feedback from the process and from piloting innovative ideas and technologies. The overall process is aimed at achieving the business objectives with minimal risk and cost (BTopham, 2013).

5. **MEASURING OF PROJECT 'DNA' MATURING IN QATAR**

In an attempt to measure the maturing of Qatar construction industry and identify what is needed to improve the adoption of Whole Life Cycle Approach (WLC) to information, the maturity model identified in section 4 is used. Pillars and their associate components of WLC identified in figure 4 have been used as a framework in a semi-structured interview with leaders in Qatari construction industry and the outline survey was reported in Vukovic.et al 2015. Using this survey and results from BIM USER DAY (www.bimuserday.com), this paper provide the first attempt in Qatar to measure

project 'DNA' maturity. Also the paper presented project 'NDA' maturity in the England, extracted and elaborated on from in different publications from BIM task force (2015) and AEC (2012), CPIC (2011), DBIS (2011), NBS (2.13) and RIBA (2013). The following presents a summary of the findings of the survey organized under the four pillars and table 1 shows the levels of maturity of each components of both Qatar and the UK measured on a scale of 0-100. As it presented in Table 1, Qatar maturity is at very low level around 20% average scale compared to UK maturity around 60% average scale.

5.1 **Policy**

Project Delivery methods: The commonly used project delivery methods are traditional DBB (design bid build) and DB (design and build). The use of Design and Build approach on projects varies from project to project. An adapted state of Design and Build project delivery method was being used on a complex project and this adapted state was named as Design-Development-Project. The project delivery in this method is done in such a way that partial design is completed by the designer and given to the contractor to develop it further and then execute it on construction sites.

Information standard: Based on the interviews, the BIM standards that are being used are mostly UK standards and US standards. BS 1192:2007, AEC (UK) BIM Protocol and BIM standards and guidelines from AIA are some common examples. When asked about the need for BIM standards for Qatar, majority of interviewees agree that there is a need to develop BIM standards for Qatar keeping in view the on-going and future construction projects that are planned for Qatar. The use of different standards on different projects may act as a barrier to adoption of BIM for Qatar Construction Industry.

BIM requirement for projects: While BIM is being increasingly required in the projects, the BIM requirements are deemed inconsistent by some interviewees. Part of the reason for this inconsistency could be lack of understanding of BIM from the clients/owners who are the policy makers for the projects. Use of different BIM standards could also be a reason for this inconsistency of requirements.

The interviews have revealed that evaluation of BIM competency of designers and contractors is mainly done based on past experience with BIM enabled projects. Some weightage is given to the BIM competency either in prequalification or bid evaluation. This weightage coupled with other criteria (including both Technical and Financial) forms the basis for selection.

The contract documents usually mention the Level of Detail (LoD) for BIM model required from designers and contractors at various stages of project but interviewees indicated issues related to practicability of such requirements.

The reason is that in most cases there is not a clear plan which is set out for facilities management or how the client/owner intends to use the model.

5.2 **People**

Almost all the interviewees interviewed so far agree on 'Lack of in-house expertise' as one of the barriers to BIM adoption in Qatar. They further agree on the need for training people on BIM specific positions e.g. BIM Manager, as well as providing BIM training to people who are not working on any BIM specific position. The contract usually mentions some BIM specific positions and puts relevant experience as a requirement for people on such positions. However the interviewees indicate that it is not easy to find people complying with such requirements.

When asked whether they (interviewees) have experienced any requirements of certifications with respect to BIM, the common answer is that there are no standard certifications for BIM so far which have gained acceptance in the construction industry in Qatar.

5.3 **Process**

When asked about the use of standard project stages in the project, it is being discovered that there are no standard project stages like RIBA stages. All clients tend to divide project depending upon their own convenience. However when asked whether project stages should be standardized or not, most interviewees suggest that it should be standardized along with clear deliverables and process maps in each stage to allow for better communication among stakeholders.

5.4 **Technology**

So far the respondents do not report major shortcomings in technology compared to other BIM fields. However certain BIM tools have limitation when it comes to complex architecture and curves. In addition most of interviewees report that the IFC exchange format when used to export the BIM model causes data loss and distortion of geometry of the model.

6 **CONCLUSIONS**

The aim of this paper was to define and present the concept of project 'DNA' in the Qatari construction industry. Four pillars that need to be developed concurrently to facilitate a proper and efficient flow of information from one phase to another of construction processes have been identified and defined. The case for both UK and Qatar has been identified and discussed.

ACKNOWLEDGEMENTS

The work described in this publication was funded by the National Priority Research Program NPRP No.: 6 - 604 - 2 - 253.

REFERENCES

AEC. (2012). BIM Protocol Implementing UK BIM Standards for the Architectural, Engineering and Construction industry. Retrieved from AEC UK website: http://aecuk. files.wordpress. com/2012/09/aecukbimprotocol-v2-0.pdf,

Al Jurf and Beheiry (2010), Factors affecting cost and schedule in Qatar's residential compounds projects, Int. J. of Engineering Management and Economics 01/2012; 3(1/2):117 - 134. DOI: 10.1504/IJEME.2012.048608.

BIM task force (2015) Building Information Modeling Task Group. Retrieved from: http:// shop.bsigroup.com/navigate-by/pas/pas-1192-22013/.

BSI (2013) PAS 1192-2. Retrieved from BSI website: http://shop.bsigroup.com/navigate-by/pas/pas-1192-22013/

BTopham (2013) "DevOps and OpsDev: How Maturity Model Works" Hewlett Packard Enterprise, http://community.hpe.com/t5/Business-Service-Management/DevOps-and-OpsDev-How-Maturity-Model-Works/ba-p/6042901#.VmF0stKLTcs (Accessed on December 4)

Cabinet Office. (2011). Government Construction Strategy. Construction Industry Council.

CPIC. (2011). CPIx BIM assessment form - Construction Project Information. Retrieved from CPIC website: http://www.cpic.org.uk

DBIS. (2011). BIM Management for value, cost & carbon improvement, report number URN 11/948, Department of Business, Innovation and Skills.

Hafeez,A M, Chahrour. R, Vukovic. V, Dawood. N, Kassem. M (2015); Investigating the potential of delivering Employer information requirements in BIM enabled construction projects in Qatar, - PLM15 (http://www.plm-conference.org/) Doha, Qatar, Oct 2015.

IQPC (2011) Five year forecast in the middle east, 2011

MDPS. (2013). Qatar National Vision 2013. Retrieved from Ministry of Development Planning and Statistics website: http://www.gsdp.gov.qa/portal/page/portal/gsdp_en/ qatar_national_vision

NBS. (2013). National BIM Report 2013. NBS National BIM library.

Paulk, M.C., Weber, C.V. and Chrissis, M.B (1999) "The Capability Maturity Model: A Summary" Institute for Software Research, Carnegie Mellon University, http://repository. cmu.edu/cgi/viewcontent.cgi?article=1013&context=isr (Accessed on December 4)

RIBA. (2013). RIBA Plan of Work 2013 – Overview. Royal Institute of British Architects

Riese, M. (2010). Building lifecycle information management Case Studies. In U. Isikdag & J. Underwood, Handbook of research on building information modeling and construction informatics: concepts and technologies, p. 650.

Succar, B, Sher, W, and Williams, A, (2013) An Integrated Approach to BIM Competency

Assessment, Acquisition and Application, Automation in Construction, 35, 174-189.

Vukovic, V. Hafeez. M, Kassem. M, Chahrour. R, Dawood. N (2015); BIM adoption in Qatar: capturing high level requirements for lifecycle information flow, - CONVR 2015 (http://www.convr2015.com/) Banff, Alberta, Canada, Oct 2015

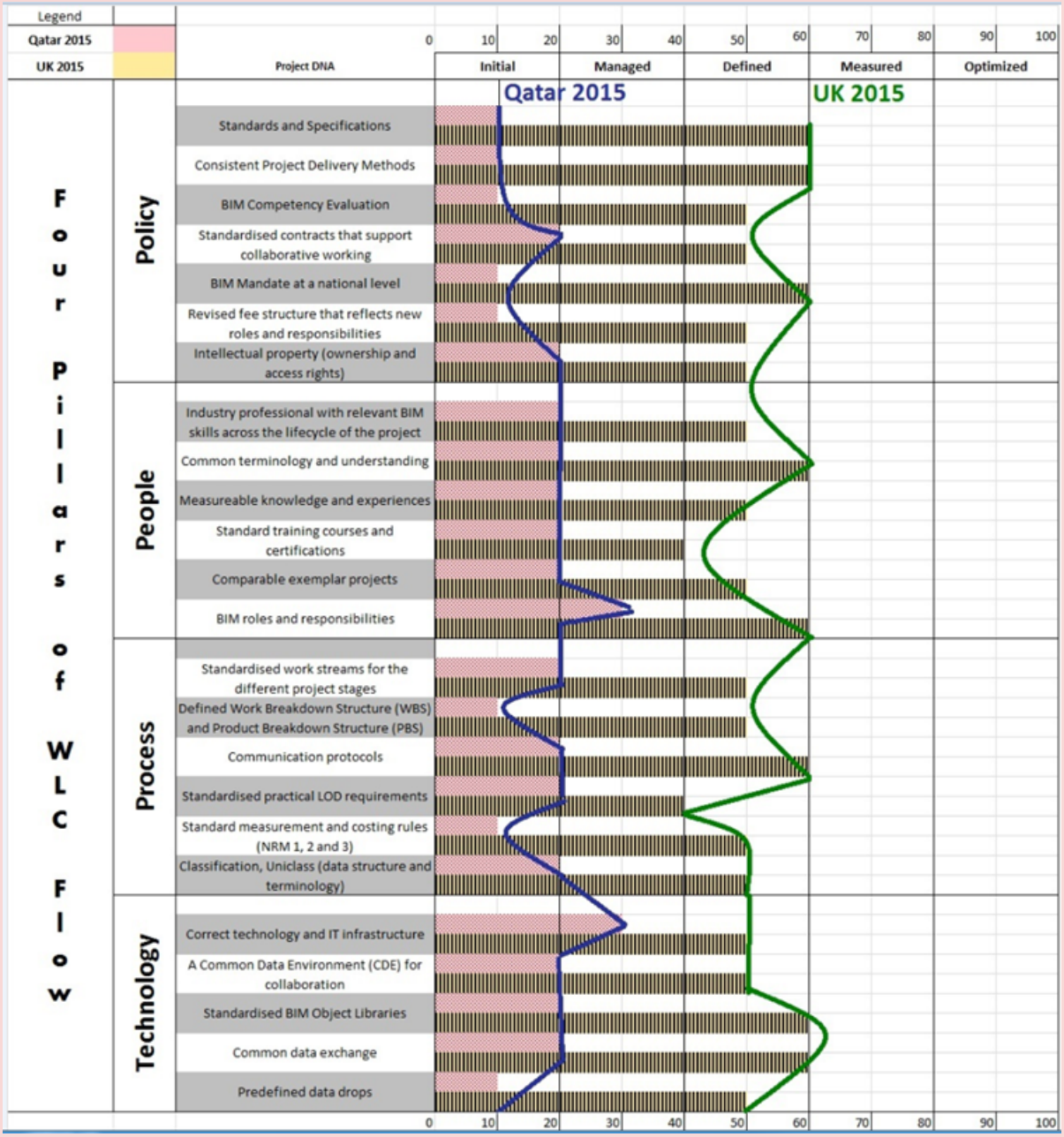


Figure 5, Maturity model of 3P+T concept

REVIT Families

Written by : Amar Altom
Translated by: Khalid Othman

If you want to gain the most power of REVIT, then you should get well understanding of what is called “REVIT Families” which will make you powered enough for project requirements also understanding the practical method of making such considerable significant elements.

I can bet that many readers asked that question “What is family?”

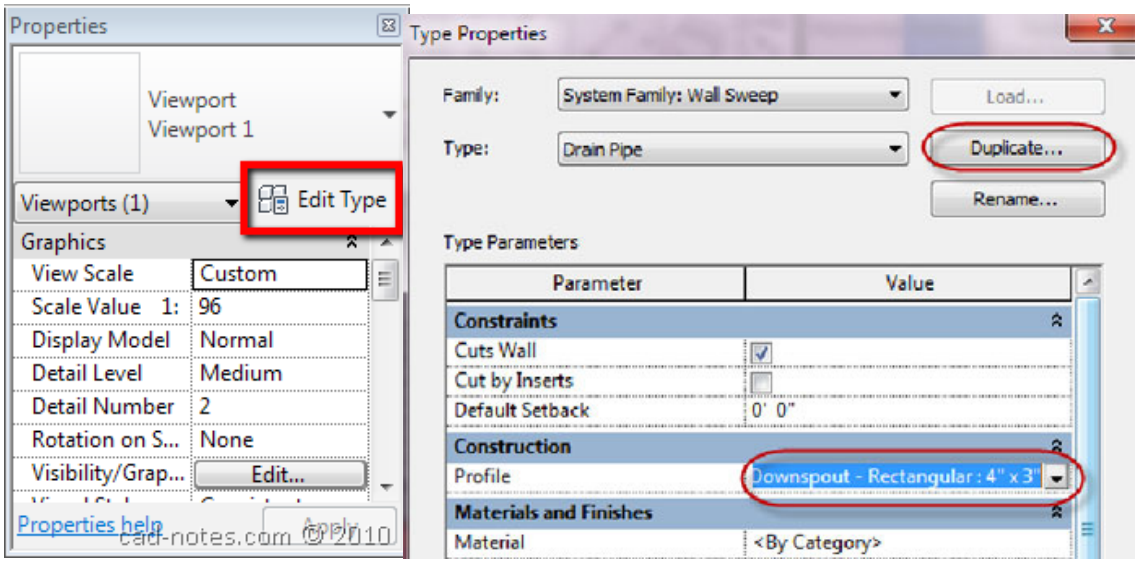
When you start a new REVIT project You have several options to choose from including starting a new project, new sheet or even making “Mass”, it is easy to know and start directly, but again what is family?

Families are the main component which are used to establish your own module like walls, windows, stairs and doors etc.

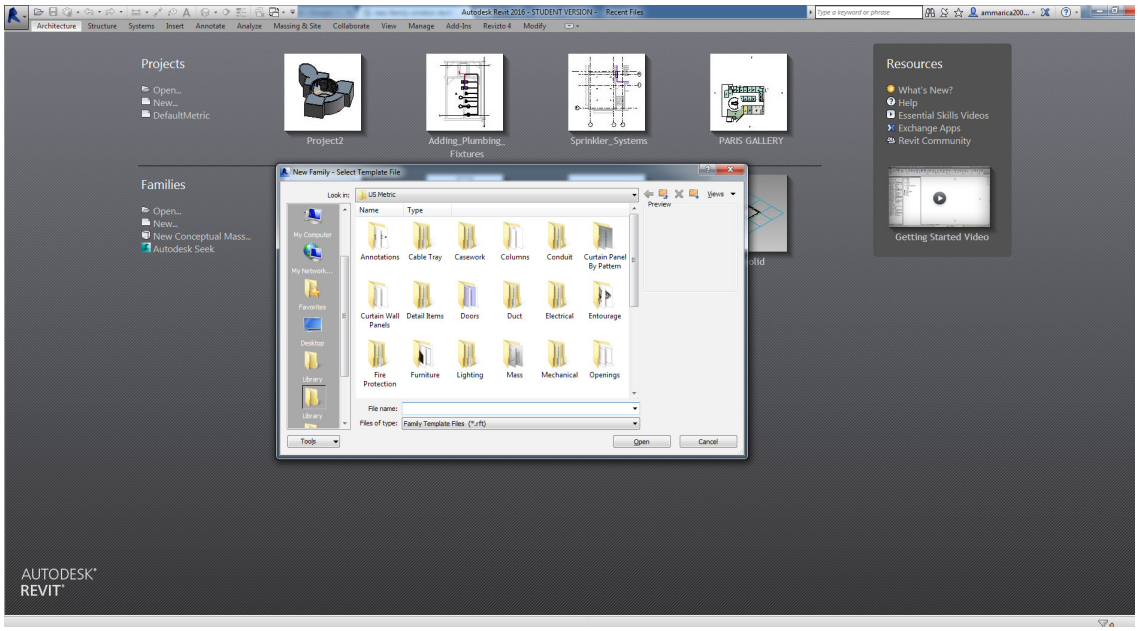
Each family can be represented by many different parameters such as size, materials and various related variables. For example, when changing the dimensions of a window during certain project phase we will get automatic changing of all other windows that have the same name and family type.

Families are pre-downloaded with both British and Metric systems, which are commonly used even there are other systems but with limited usage. However, we can create families according to the requirements of the project and from scratch or modify one of the existing families as follows:

- We select the family that is already in the project and click on “Edit Type” then “Duplicate” and it will be saved with a new family name which we can modify whenever we need without affecting the original family from which it was originated.

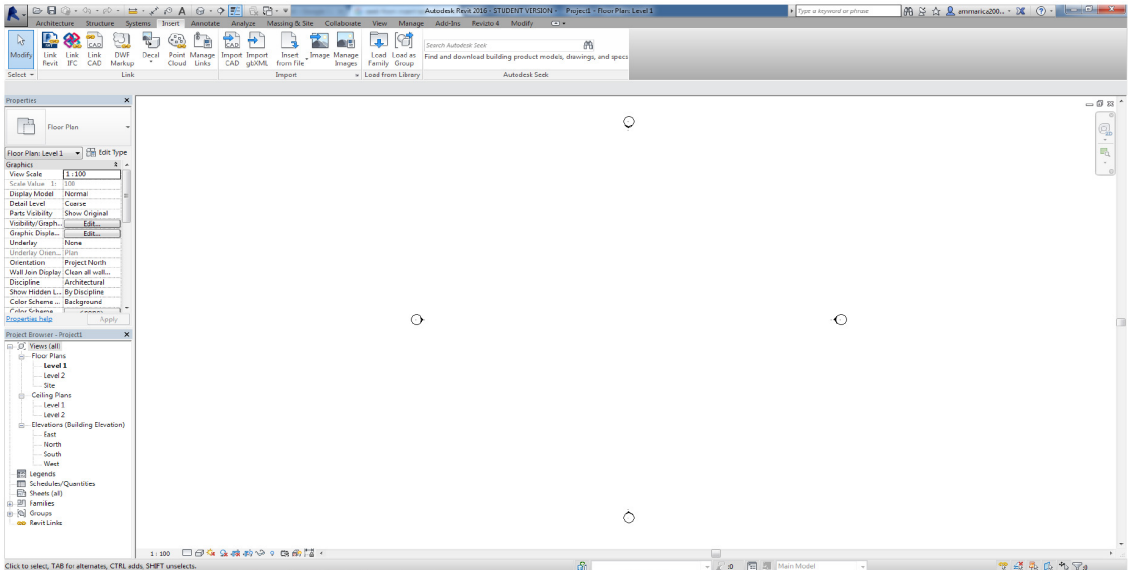


- Also we can create a family from scratch by going to “File” then “New” and then “Family” where a new window will appear with a list of ready-made templates to choose from and start the family work by editing it.



In addition, we can download ready-made families from the Internet where many companies and sites maintain their products Revit families.

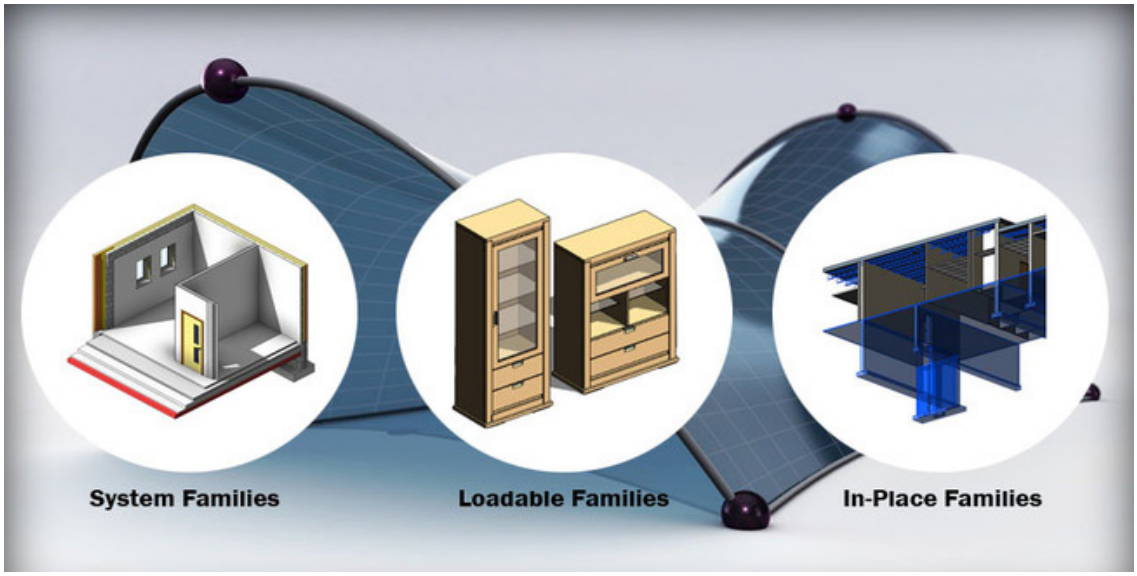
By the way you can choose these families through “Autodesk Seek” from the tab “Insert” or directly through “revitcity.com” or “BIMobjects.com” where you can free download any selected families among many different family types, which reflects BIM importance due to its enormous advantages.



bimobject® RevitCity

We have to define three major types of families:

1. System Family
2. Loadable Families
3. In Place Families

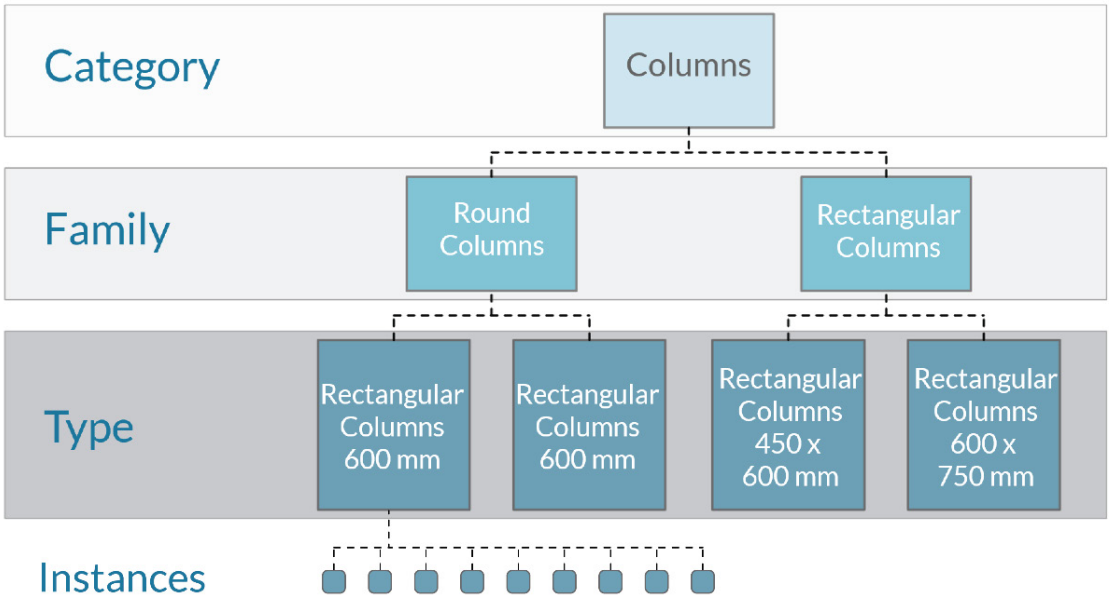


Firstly, we need to indicate that the REVIT library is divided to

- categories

  then families

  then types

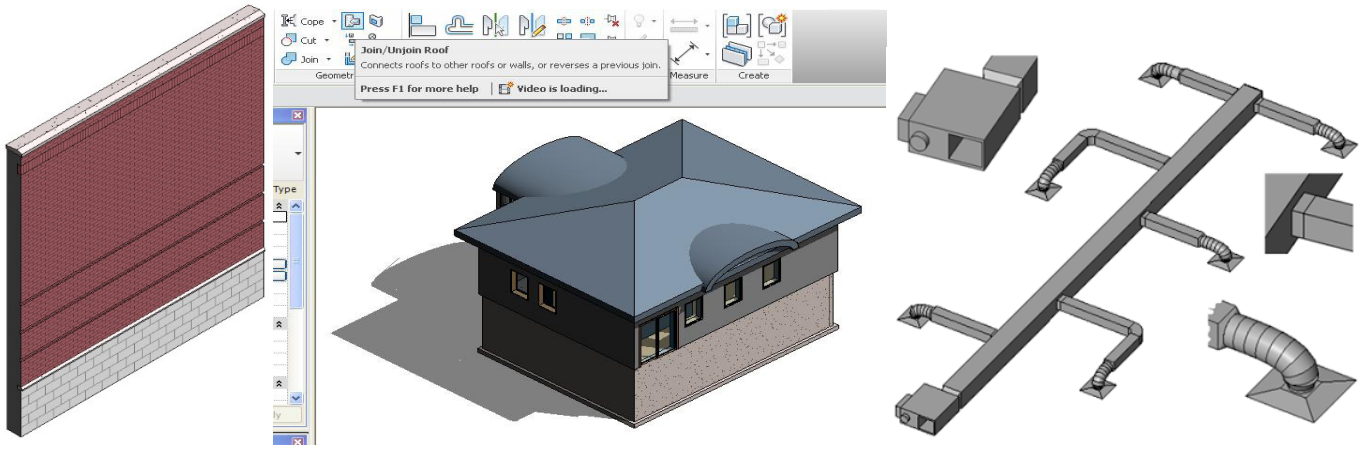


System Families

Are responsible for the composition of the main elements of the model such as walls, roofs, floors, pipes and ducts.

It also includes system settings that affect the project environment such as Types of Levels, Grids, Drawing Sheet & Viewports.

Also it is important to know that these families type can't be retrieved from external files and can't be saved in external folders of the project.



Loaded Families

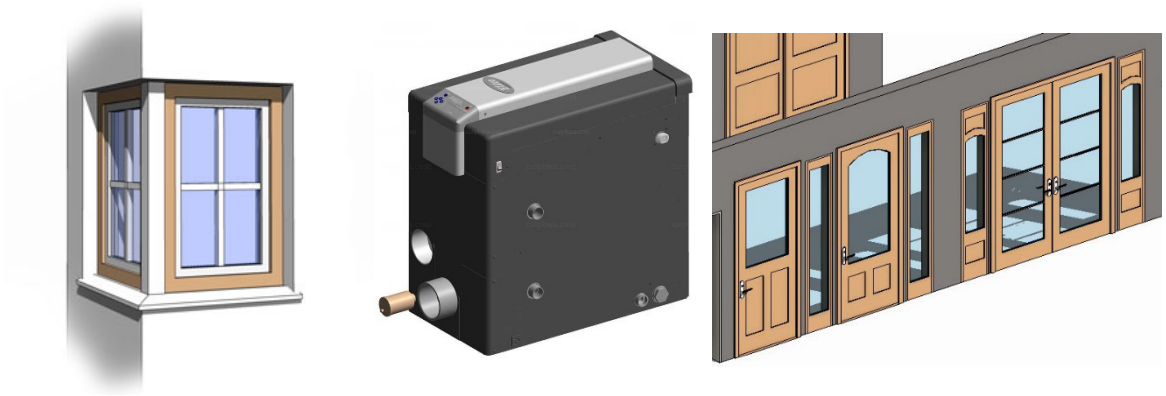
Which include the components of the building that are purchased and installed such as doors, windows and furniture, as well as boilers and heaters, air handling units and sanitary tools.

Also there are some symbols that can be allocated to control the project.

As a result of their high customization ability and including several variables , they can be exported and imported from and to the project.

Also many types could be made for one family.

I addition we can use catalogs that allow you to import the only types you need for a project.



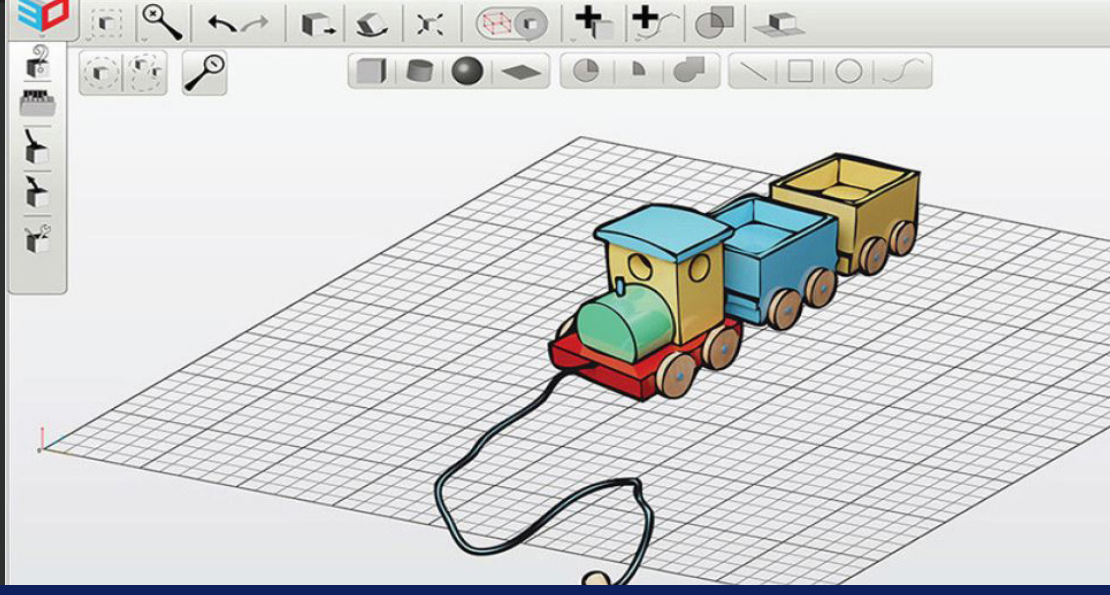
In Place Families

It's another type of unique families which allows you to fabricate a completely new product that isn't available at the external sources enabling you to make more edits leads to an accurate control and complete editing anytime.

In general REVIT provides special environment that allows users to easily and simply making any type of families.

This was a close brief look on Revit families as a main component of Revit model.

Written by
Omer Selim
Translated by
Youssef Elsaadony



Make Your Son a Model Designer

Yes, you can stop buying toys for your children from today because your son will design his own toy and print it on a three-dimensional printer. He can even design the house of his puppy as if he were an architect then print it on a three-dimensional printer.

This distinguished program can be useful for the men of the future (your children) to be fit to start from four years to learn 2d, 3d graphics and printing on 3D printer.

This program can also be useful for engineers and students while using specialized programs in three-dimensional graphics such as Autocad, Rivet, 3ds Max, Blender, Sketch Up and Rhinoceros and also working with BIM software as plugins.

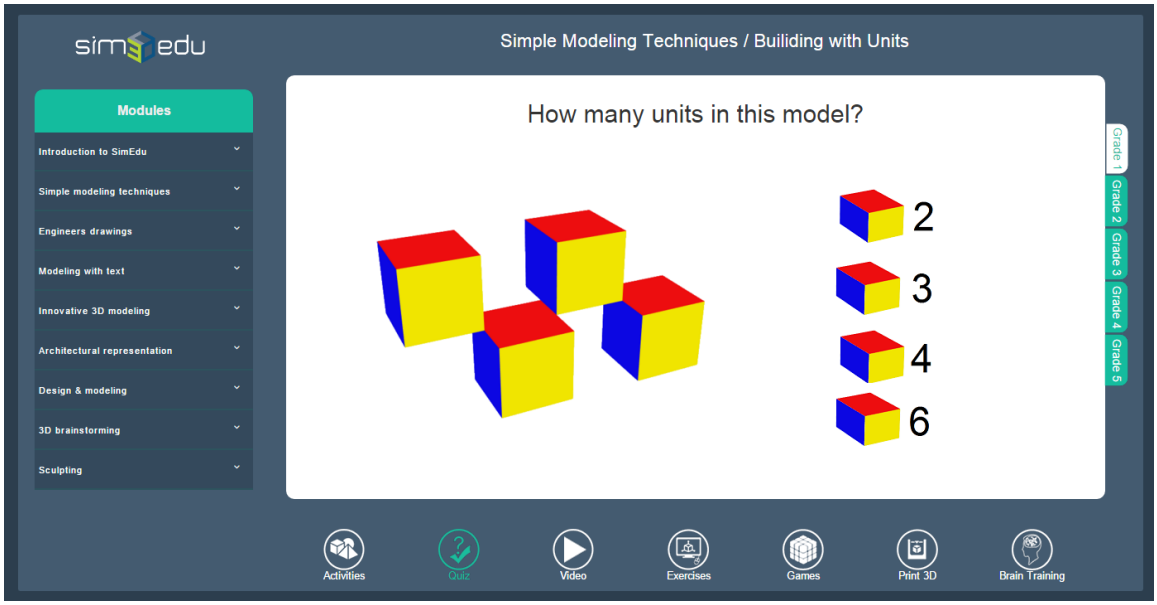
The idea of the program is very interesting , simply you sketch top view, side view and front view then 3D model is created out from 2D shapes unlike Revit where you draw 3D model then program create different views such as elevation, side and so on.

This product is divided into three main parts:

The first part is a training program (SimEdu) for basic concepts in which child learns the 2D & 3D transformations and how to model shapes and print it on 3D printer in 4 hours. SimEdu also contains many meaningful games related to learn about geometric shapes.

There's a video of a four year old child where one of the pieces of his cubes was lost and he designed it using the AB3Dbasic App on his father's Android mobile to print it.

https://youtu.be/TqimDHzppHk



The second part is the program itself which is compatible with Windows, Apple, Android, ios and Ipad. The program has different versions such as:

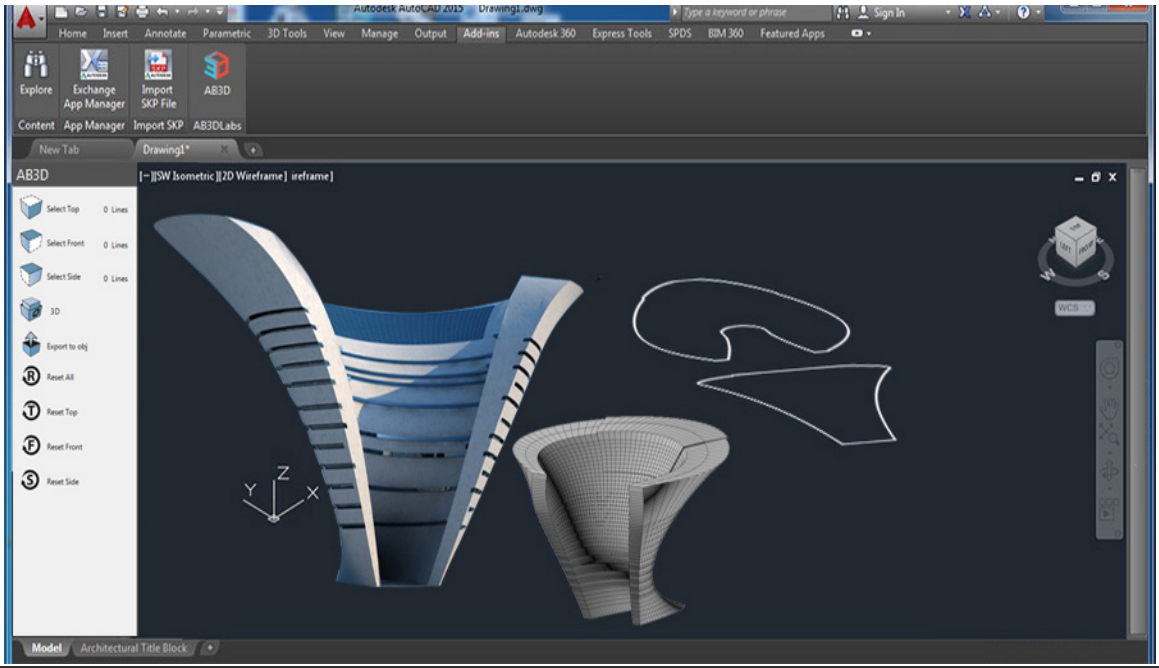
AB3DBasic: simplest design version with main orders that you can create 3D model by sketching top, side and front views.

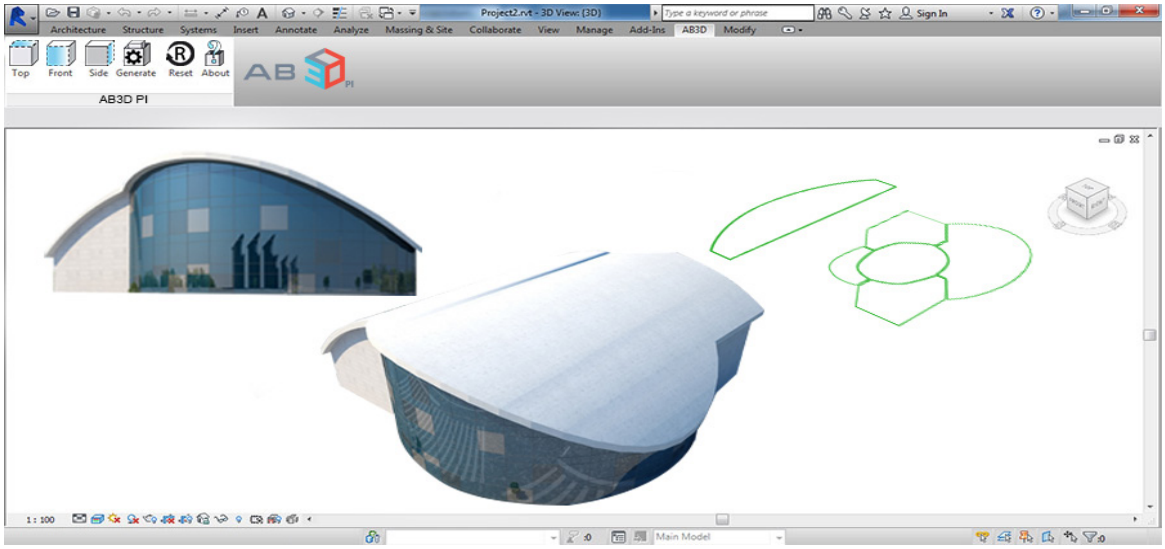
AB3DXtd: version with greater options, the designer can use up to 12 layers to control the output of his design.

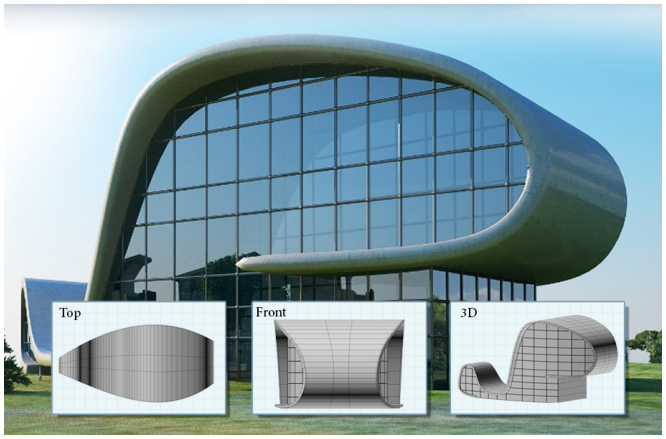
AB3DPro: this version for professionals that you can use all options in AB3DLAB software and you can also enjoy the design in 3D

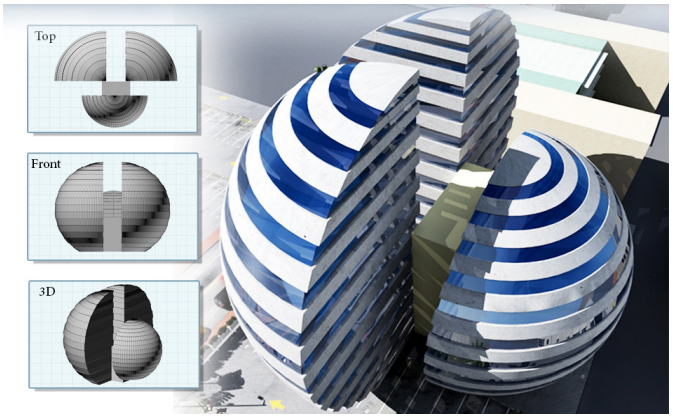
third part that the program is available as plugins in major engineering software such as SketchUp, Revit, Autocad, Rhinoceros, 3ds Max and Blender

There are examples of what you can design with AB3Dlabs









To get a Free Trial

http://ab3dlabs.com/Freetrial.aspx

Youtube Channel

https://www.youtube.com/channel/UCB_NFpqsLV-qtyIf7HiVS0W

No Rights reserved

Charity is the noblest and greatest deeds in our life, such an engineer who volunteered his time, effort and knowledge to design a charitable hospital and this is more useful than only donating money.

Discussion about the copyrights led to no rights reserved magazine, you can easily copy, quote, share, reprint and distribute any article or issue without any conditions except mentioning the source, so BIMarabia magazine is open source with no right reserved. May Allah bless who said: “If we monopolize our ideas and beliefs and become angry when the others impersonate to themselves, and strive to asset their proportion to us and the aggression of others on them, We do all this when our faith in these thoughts is not great, when they do not emanate from our depths as if they were not our will, when we do not love them more than ourselves”.

That the pure joy when we see our ideas and beliefs belong to others while we are still alive, Just imagine that it will become a gift to others even after our death, this is enough to pour our hearts with satisfaction and happiness and reassurance.

Only merchandise are keen on the commercial relations of their goods, so as not to be exploited by others and deprive them of their right to profit, On the other hand, the intellectuals who have beliefs who are happy when people share their ideas and beliefs and believe in them to the extent that they attribute them to themselves no to their owners, they do not believe that they are the owners of these ideas and beliefs, but they are just intermediaries in the transfer and translation, they feel that the well from which they derive from neither their creation nor the making of their hands, and their holy joy due to reassurance that they are in contact with this well.

Imam Shafei said “I would like if these science taken away from me, and nothing was attributed to me”

BIMarabia

10th Issue January 2018